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THE BRICKBVILDER

OFFICE 85 WATER STREET BOSTON

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

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THE BRICKBUILDER is published the 20th of each month.

MR. E. W. GODWIN, one of the brightest and most artistic of the English architects, founded some years ago, shortly before his death, the prize which bears the name of the Godwin Bursary, providing for a course of foreign travel and study on the part of a properly equipped architectural student. Several of the men who have held this prize have come to America and have made some very interesting and salutory comments upon our national architecture, particularly in its constructive manifestations. The latest holder of this prize, in his report to the Royal Institute, had occasion to consider the skeleton construction which has found so much favor in our larger cities. The apparent flimsiness of it, the seeming sham, impressed him quite strongly, and he made a number of comments upon it which are in a measure justified, though they are inspired very largely by his point of view. We are free to say that we do not unreservedly believe in the skeleton construction. It is in a way untried, it presents possibilities of failure which might be very serious, and it is a species of building construction which has been sadly misused. At the same time no intelligent observer can deny that as a system of erecting tall buildings it has come to stay, and that though we may not use it aright, though it has very decidedly objectionable features, at the same time it embodies possibilities which give promise of a healthy and an interesting development. We have learned a good many structural lessons from it, and we have been able to practically solve problems which would be impossible of solution with any of the older methods, and yet we can quite understand how strange, how contradictory, and how altogether bad such a system would seem to a foreigner trained in the conservative methods of the English school of architecture, and with also a very probable lack of appreciation of the practical necessities of which this system is an outgrowth.

In the editorial of last month we had occasion to call attention to the ephemeral character of much of our modern architecture and to express the hope that we were approaching an era wherein structural conditions more approximating those of the Romans might obtain. We cannot, however, believe that these solid Roman characteristics will ever be able to find an enduring place in our street architecture, which is necessarily forced into a thinness of construction, a minimizing of supporting members, which at once necessitates a certain change in the details of expression. It is the custom to characterize the architecture of this period as retrospective. We borrow nearly all of our architectural baggage, and it is not strange that when we attempt to apply historic forms to skeleton construction the result should seem to a stranger incongruous and often shoddy, especially if that stranger does not thoroughly understand the causes which have led up to the particular manifestations in design. Given the necessity for the least possible area of supporting members and the greatest amount of light in the wall surfaces, and we have a condition of affairs so different from anything which obtained during previous historic periods that, though we may use the forms of the Greeks and Romans or copy most directly many of the motives of the Renaissance period, the result is bound to be different, and in the process of assimilation we have very naturally not yet been able to thoroughly unite the details of expression to the general idea. But there is one thing which surely can be said with truth about the tall structures. They are not commonplace, and there is far more hope for a hopelessly bad design than there is for one which is hopelessly commonplace. Up to the time of the Centennial our architecture as a whole was both hopelessly bad and hopelessly commonplace. We have gotten bravely over the latter defect and it looks as if we were developing out of the former.

Theoretically there are two schools of designing a building, one which considers that all the ornamentation of the exterior, the disposition of the parts, should make manifest the constructive lines, while the other considers the ornamentation purely as a matter of decoration, not holding that it is necessarily a part of the construction. The former has a more logical sound; and yet with all the logic which has been expended upon this subject, including such poetic analysis as men like Ruskin have been able to bring to it, it is fair to say that there has yet to be designed a modern commercial building which really honestly shows its construction. Surely none of the skeleton constructions have in any way been able to show what they are built of, and however the theory may be, in fact we construct as best we may, and then proceed to apply ornamentation to the exterior. It goes without saying that as a young nation, as one that is only just beginning to feel its artistic possibilities, we use our ornament blindly, we copy our historical precedents often at random and without reason, and the baldness of our constructive decoration may appeal to a stranger as it evidently has to the Godwin Bursar. And yet this seeming inchoate condition is so essentially an element of development that it is not altogether to be deplored. The conditions of growth were the same during Romanesque development, and, for that matter, during the early Renaissance period. So long as our architecture is not commonplace we can afford to be incoherent, and by sticking to the main motives,

by trying to improve along the lines of least resistance, a development is bound to come even if it is not already here; and though we may not appreciate it until it has arrived or even until after we have gone to the other extreme, we can at least take example from the past, and by keeping at one line of development can be pretty sure in the end to arrive at architecture which is both coherent, reminiscently correct, and is at the same time true to the essential conditions of construction. We shall not achieve development by startling manifestations in design or by endeavor to arbitrarily make our construction fit our ideas of decoration, but rather by working out our construction just as it naturally comes, and then trying to clothe that with forms which seem to produce beauty and fitness, keeping always within safe limits. A very successful architect used to tell his draughtsmen that the best advice he could give them in designing a building was to look through the files of the architectural papers until they had found about the kind of structure they wanted to make, and then go to work and do the same thing, only better. One of our prominent architectural clubs has made a practise in its monthly competitions, of re-designing public buildings, choosing some prominent structure, and asking its members to see wherein it could be improved. It is exactly along these lines that lies our greatest hope, and it does not make any difference if we do borrow our baggage from Rome or Greece, we have the bones. If we consistently and continuously try to improve on the expressions that have already found utterance, using, if we wish, the same forms, the same details of decoration, but striving to make them a little better, a little more fit, a little more approaching our ideas of beauty, the end cannot be in doubt; and though our skeleton constructions, carried out on these lines, may seem thin and unsatisfactory, though the reasons for what we do may appeal only to ourselves, and not be really clear to our own eyes, so long as we design with a definite purpose, and try honestly to cover our architectural forms with as much beauty as we know how to use, we are producing architecture which is certainly above the commonplace, and which is bound to take rank as development.

CLEANING OF OUTSIDE WINDOWS IN TALL BUILDINGS.

A FEATURE of modern commercial structures which has only within recent years received any attention is a proper provision for cleaning the glass in windows without endangering life or limb. There have been a number of patented devices put upon the market permitting both the appearance and the conveniences of the ordinary double-hung sash, but with the mechanism so arranged that the sash can either be reversed and washed from the inside or can be swung in like a casement. As far as we are aware, however, Chicago, which has been the pioneer in so many of the modern developments of commercial architecture, is the first to recognize the necessity for provision for safety in tall buildings. The following is an extract from the ordinance passed March 28, 1898: —

"SECTION 198.— In all buildings of Class I., II., IV., and V., the Windows above the second story shall be so constructed as to permit the cleaning of them from the interior of the Building, unless suitable stationary platforms, balconies, or porches admit safe access to the outside of such windows.

"SECTION 65.— As a means of reference in this ordinance, Buildings erected within the fire limits (sheds and shelter sheds as before described being excepted) shall be divided into classes as follows: —

"CLASS I.— In this class shall be included all buildings devoted to the sale, storage, or manufacture of merchandise, and all stables over 500 square feet area.

"CLASS II.— This class shall embrace all Buildings used as residences for three or more families, all hotels, all boarding or lodging houses occupied by twenty-five or more persons, and all office buildings.

"CLASS IV. and V.— These shall include all Buildings used as assembly halls for large gatherings of people, whether for purpose of worship, instruction, or amusement."

Such action as this is certainly to be commended on every ground, for while there are plenty of men who are willing to risk their lives by climbing out on a narrow ledge ten or fifteen stories above the sidewalk, to clean the outside of the glass windows, their willingness does not excuse the risk which they run, which risk, we imagine, the owners of property, no less than the building inspectors, would be glad to provide against.

ILLUSTRATED ADVERTISEMENTS.

NUMBER eleven of the series of brick and terra-cotta fireplace mantels, of which J. H. Ritchie is the designer, is illustrated in the advertisement of Fiske, Homes & Co., page vii.

The residence of Edmund Hayes, Esq., at Buffalo, N. Y., of which Green & Wicks were the architects, is illustrated in the advertisement of the Harbison & Walker Co., page xv.

A spiral staircase (Guastavino construction), extending through five stories of the Paterson Bank, at Paterson, N. J., Charles Edwards, architect, is shown in the advertisement of R. Guastavino, page xx.

PILASTER CAPITAL FOR BOTANICAL MUSEUM, BRONX PARK, NEW YORK.
Work executed by the New York Architectural Terra-Cotta Company.
R. W. Gibson, Architect.

The Boston Fire-proofing Company illustrate in their advertisement, on page xxii, the American Express Company's building at Boston, Winslow & Wetherell, architects.

A view of the skeleton construction of the new Westminster Chambers, Copley Square, Boston, of which Henry E. Cregier, Chicago, is architect, is shown in the advertisement of the Fawcett Ventilated Fire-proof Building Company, page xxiv.

PERSONAL AND CLUB NEWS.

E. G. W. DIETRICH, architect, has removed his office from 18 Broadway to 15 West 28th Street, New York City.

WOODRUFF LEEMING, architect, has removed his office from 726 Fulton Building to 617 Constable Building, New York City.

THE firm of George & J. P. Kingston, architects, Worcester, Mass., has been dissolved. John P. Kingston will continue the business at 518 Main Street.

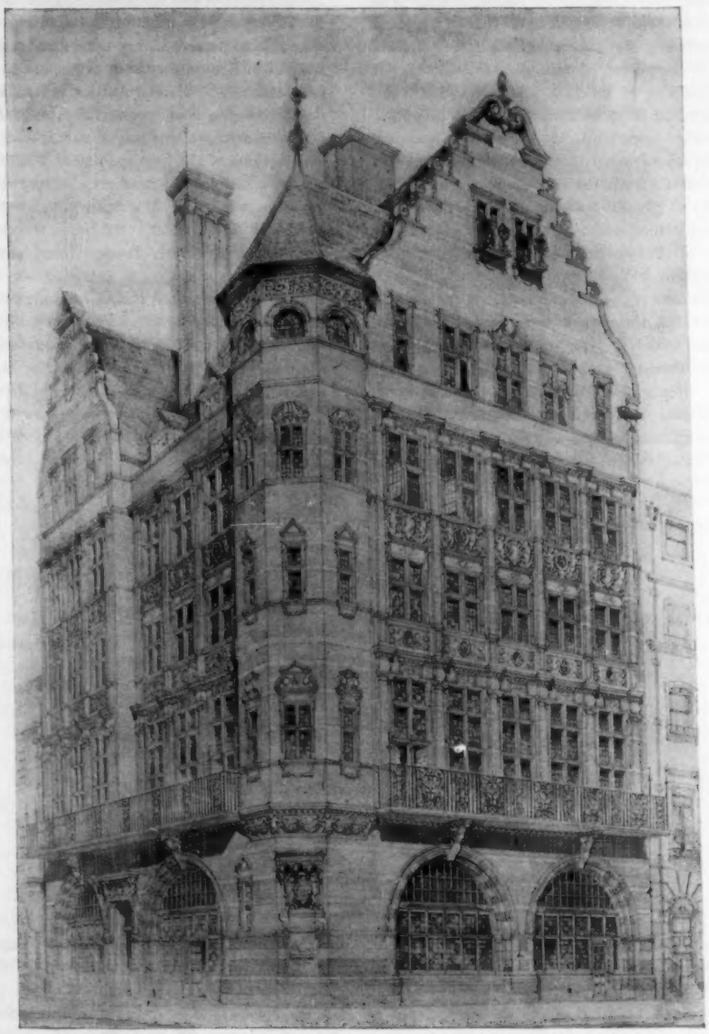
EDGAR S. BELDEN and Augustus B. Higginson have dissolved the partnership under the firm name of Belden & Higginson and will henceforth practise the profession of architecture independently. Both have taken offices at 164 La Salle Street, Chicago.

THE third exhibition of the National Sculpture Society opened May 1, in building of the American Fine Arts Society, 215 West 57th Street, New York City.

ON Monday evening, May 2, Mr. Theodore M. Pietsch, lately returned from the Ecole de Beaux Arts, Paris, addressed the members of the Chicago Architectural Club on "Student Life in Paris," special reference being made to those studying architecture. Wednesday evening, May 4, was devoted by the club to Architecture, it being one of the series of lectures given under the auspices of the Central Art Association. At this meeting the following gentlemen spoke: Mr. George R. Dean, "Some Modern Ideas of Architecture"; Mr. Frank M. Handy, "A Plea for More Honest Living"; Mr. Robert C. Spencer, Jr., "Is there an American Style of Architecture"; Mr. Dwight H. Perkins, "Criticism of Architecture by the Public"; and an informal talk by Mr. Louis J. Millet. On the morning of May 5 Mr. Frank Wright delivered a lecture on "Art in the Home." At the same session Mr. William Ordway Partridge spoke on "The Relation of Art to Practical Life."

THE series of five discourses on "Architectural History" given by the Detroit Architectural Sketch Club at the Museum of Art has been a great success.

Norman and Gothic (illustrated), by Mr. J. E. Scripps, and Renaissance (illustrated), by Mr. A. Kahn, of Nettleton & Kahn, architects, completed the course. The large attendance showed the general appreciation and benefit of these papers. They will be repeated in a similar way next season. On March 28 M. B. Burrows was elected a director and J. A. Gillard, secretary, to succeed A. Blumberg.



OFFICE BUILDING FOR ALLIANCE ASSURANCE COMPANY, LONDON.
R. Norman Shaw, Architect, London.

THE T SQUARE CLUB, Philadelphia, held its regular meeting on Wednesday evening, April 20, at which the criticism and award of mentions on the drawings submitted in competition for the cover for the Club Syllabus for the coming season of 1898-99 was taken up. First mention was awarded to Nicola D'Ascenzo; second and third mentions, to Horace H. Burrell.

The annual meeting of the club was held on Wednesday evening, May 11, at which there were present forty-eight members. The treasurer's report showed the club to be on a secure financial footing.

The medals for the competitions held during the past year were awarded as follows: Gold medal, Nicola D'Ascenzo; silver medal, Horace H. Burrell; honorable mention, Charles Z. Klauder.

The following officers were elected for the ensuing year: President, Edgar V. Seeler; vice-president, Adin B. Lacey; secretary, Herbert C. Wise; treasurer, Horace H. Burrell; executive committee, David K. Boyd, Walter Cope, and James P. Jamieson; house committee, Nicola D'Ascenzo, George B. Page, and Frederick M. Mann.

CORNELL GRADUATES, ATTENTION!

ALL men who have studied architecture at Cornell University, no matter what their age may be, are requested to send their names and addresses to Prof. A. B. Trowbridge, Ithaca, N. Y., in order that they may receive data relative to the new Traveling Fellowship, the existing Graduate Fellowship, the new Two-Year Special Course in Architecture, the Illustrated Annual, which is soon to appear, and the competition for an Alumni Hall, which will probably be held in the near future.

The American Schoolhouse. VII.

BY EDMUND M. WHEELWRIGHT.

IN the Latin and English High School of Boston, begun in 1877, is found the first important application of sound principles of architectural planning to the school buildings of this country. The design of this building was in the main based upon that of the best Vienna schools, and while some of the features which here appeared are bettered in the later development of schoolhouse planning, it still remains an excellent building of its class, and in respect to the dimensions of its schoolrooms, 24 ft. in width and 14 ft. in height, it is superior to most schoolhouses since built. It will be seen from the plans that the lighting of its schoolrooms is almost wholly from one side, while light is also borrowed from the corridor windows. The provision made for hanging of pupils' clothing is not satisfactory, closets for this purpose being placed under the windows. Mr. E. P. Seaver, the Superintendent of Public Schools of Boston, writes: "These were not high enough to hang a coat in, and to fold a wet coat and stuff it into such a closet is bad for the coat. After a short experience with these cupboards, they were abandoned, except for caps, books, and other small articles. For overcoats, horses were provided, which stand in the corridor or in the schoolroom, as may be found more convenient." Separate wardrobes on the same floor with schoolrooms, or individual lockers in the basement, are, of course, preferable to this arrangement.

The heating and ventilating system is much less satisfactory in this building than in later schools of its class. In fact, it is absolutely the reverse of the system now adopted, by which the air is made to pass from the corridors to the rooms. In the Latin and English High School the passage of air is from the rooms to the corridors. The heating is by the indirect system alone, and not by direct radiation, while heated fresh air for ventilation is supplied by a plenum fan, the system now recommended by the highest authorities. In this building a supply of but 8 cu. ft. per minute for each pupil was contemplated, while to-day the laws of Massachusetts require at least 30 cu. ft. per minute for each pupil. This requirement of air delivery marks the notable progress made in the heating and ventilation of our schoolhouses in a generation, for it should be remembered that this building was generally considered, when built, to be the most perfect in all its features of any schoolhouse in the country. Judged by the criterions of its day, the only just criticism this building received was that in regard to the lack of proper provision for the storage of pupils' clothing.

CAMBRIDGE HIGH SCHOOL, CAMBRIDGE, MASS.
Chamberlin & Austin, Architects.

The Latin and English High School was designed by the then city architect, who worked in conjunction with Dr. John D. Philbrick, at that time superintendent of Boston public schools. In a description of this building Dr. Philbrick said: —

"The great fire, which came so near being disastrous to the project, turned out to be one of the causes of its ultimate success, by necessitating delay in building. Had the work gone forward with dispatch, as intended, the edifice erected would have been, without doubt, a substantial and costly one, and fully up to the standard of the best in the country; but it would not have been up to the standard of the best schoolhouses in the world, as this building is, for the simple reason that the knowledge requisite did not exist in this country. The most of the pupils in the public schools of Boston had better accommodations than those of any large city in the world; but we had no one schoolhouse equal to the best in the world. The characteristics of the best schoolhouses in this country were well known to me, and I had some knowledge of school architecture abroad; but it was not until I visited the Akademische Gymnasium, in Vienna, at the time of the Universal Exposition of 1873, that I was able to picture in my mind the image of such a building as we wanted in Boston for these two schools. The study there begun was followed up by visits to other first-class high-school buildings, not only in that city of wonderful schools, but in all the principal cities of Germany. In this way a valuable collection of views, plans, and descriptions of the best specimens was obtained.

"In respect to school architecture, while we made a better showing than any other American city, we were quite eclipsed by some of the European cities; that is, in some of the foreign cities schoolhouses have recently been erected which are architecturally and pedagogically superior to anything we have to show. The city of Vienna has individual school buildings vastly better than the best in Boston; but if you take all the school buildings in Vienna, the good and bad together, the average accommodations afforded to all the children of the city are perhaps not equal to the average of the accommodations provided for the children in Boston. What I mean to say is this: that Vienna knows how to build, and has built school edifices which are more durable, more safe, more convenient, more costly, and more beautiful, than any Boston has yet built, or is likely to build in the near future. The reason of this is, that in Vienna, when a schoolhouse is planned, it is done by the combined science and wisdom of the most accomplished architects and the most accomplished pedagogists. No mere whim of a schoolmaster, and no mere whim of an inexperienced and uneducated architect is allowed to control the design."

"In its general arrangements the block plan consists of a parallelogram 423 ft. long by 220 ft. wide, the longest sides, or main buildings, fronting on Warren Avenue and Montgomery Street, the Latin School occupying the former, and the English High School the latter.

"There are two courts within this block, of equal size, the division between the two being made by the location of a central building which is connected with the two main street fronts by means of a transverse corridor. These courts, as the plan shows, not only afford the most desirable advantages of light and air, but also serve the purpose of separate playgrounds for the pupils of each school.

"Across the easterly end of the block and connecting its two sides are located the drill hall and gymnasium; and across the westerly end, fronting on Dartmouth Street, a building, as shown on the plan, is proposed to be erected hereafter, as has been mentioned, for the accommodation of the school board and its officers.

Each of the street fronts of the main buildings is divided into three pavilions, — one central and two end pavilions, — the central pavilion being more pronounced in its proportions as to width and height. The main buildings have three stories and a basement, the latter being a clear story facing the courts.

"The arrangement of the plan is simple; longitudinal corridors extend the full length of the main buildings and parallel with the

street fronts. In the central pavilions, opposite the ends of the transverse corridor, and at its intersections with the longitudinal corridors, are placed the two grand entrances, one from each street. These entrances are a feature in the design, both internally and externally, ample space being given at the intersections of the grand corridors where they are located for the placing of statuary. There are also four other entrances from the streets, two in each main building, at the terminations of the longitudinal corridor, one being in each end pavilion.

"There are eight staircases, one in each end pavilion, connecting with the entrances at the terminations of the longitudinal corridors, and two in each of the central pavilion, right and left of the grand entrances respectively.

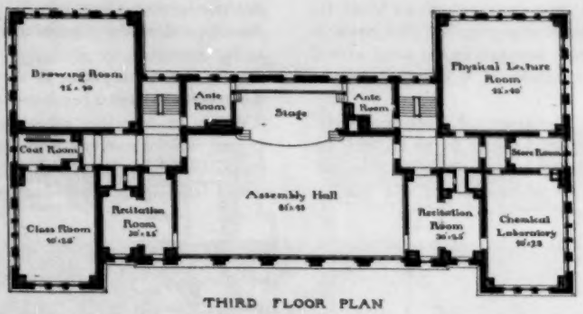
"The drill hall, another feature in the design, is on the street level. It is 130 ft. long on the floor by 62 ft. wide and 30 ft. high; above the galleries, which are at the ends, it is 160 ft. long. The seating capacity of floor and galleries is sufficient for twenty-five hundred persons. It has four broad entrances: at the ends, from Warren Avenue and Montgomery Street; at the sides, from Clarendon Street and the eastern court. The floor is of thick maple plank, laid in a solid bed of concrete. It is finished in natural materials, and is so treated as to get a constructional effect of open timber work, the wood being of hard pine, shellacked and varnished, and the interior walls of Philadelphia face brick, laid in bright red mortar, and trimmed with buff sandstone.

"There are forty-eight schoolrooms, twenty being on the first and second floors respectively, and eight on the third floor; twelve receive their light from the courts, the remaining thirty-six occupy the street fronts. The typical schoolroom of this building is intended for thirty-five pupils, but will accommodate forty or more, according to the mode of seating and the size of the pupils. It is 32 ft. long and 24 ft. wide and 14 ft. high. It is lighted by four windows, 9 ft. 6 ins. by 4 ft. 6 ins., placed on the longer side 6 ins. from the ceiling and 4 ft. from the floor, and equally spaced, with transom sashes hung, as shown in the cut, above the sliding sashes. It has, on the side opposite the windows, two doors opening from the corridor; over the doors are top lights for ventilation, and between them two high lights hung on hinges. The pupils face the platform at one end of the room, and receive the light on their left. Under the windows are cabinets for coats and caps, there being no separate rooms for this purpose. There is a closet sunk into the end wall, where the platform is, for a teacher's wardrobe. This description applies to most of the rooms, and where there is a variation from it the difference is not essential.

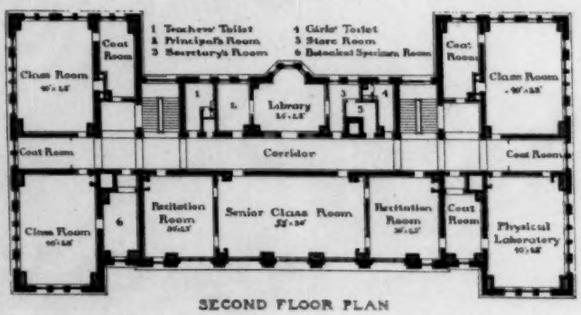
"The assembly halls are on the third floor, in the central pavilions, are 82 ft. long by 62 ft. wide, and 25 ft. high, each having a seating capacity for eight hundred and fifty pupils, with the amphitheater arrangement.

"The library rooms are on the first floor, on the right and left from the transverse corridor in the central building, each being 54 ft. long and 32 ft. wide, with octagon ends to catch the light at different angles. They are furnished with bookcases against the wall on all sides, excepting the door spaces, made of light oak, about 6 ft. high, with glass doors. The windows come down to the top of the bookcases.

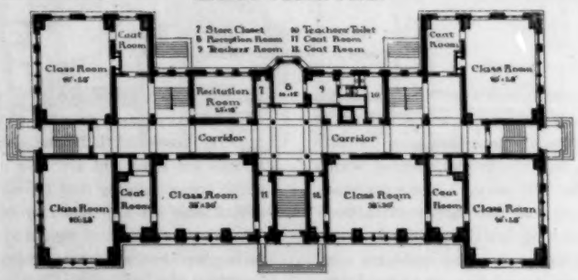
"Over the libraries, and of the same size and shape, on the second floor, are the lecture halls for the natural sciences. Each of these has two conveniently connected rooms — one for physical apparatus and the other for specimens of natural history.



THIRD FLOOR PLAN



SECOND FLOOR PLAN



FIRST FLOOR PLAN

CAMBRIDGE HIGH SCHOOL, CAMBRIDGE, MASS.

"Near the principal entrances, on the first floor in the central building, there are for each school a teacher's conference room, with an adjoining reception room, a head master's office, and a janitor's room; on the second floor adjacent to the transverse corridor are two suites of apartments, each having four rooms, for janitors' dwellings, each suite being connected with the basement by a separate staircase.

"In the central pavilions, at convenient locations on each floor, there are ample dressing rooms for the accommodations of the teachers. The water-closets and urinals for the pupils are located in four sections winged out from the principal staircases in the central pavilions, and are arranged in tiers, there being two stories of closets to each story of the building, one of which is entered at the corridor level, and the other from the half landing of the staircase above. There are six of these tiers in each section, which are connected by a spiral staircase in a round tower at the exterior angle running from the basement to the roof of the building, the top of which is surmounted by a large ventilator. By other means in addition to this the closets are completely ventilated. There are two spacious drawing rooms for each school on the third floor — one for model drawing and the other for copy drawing, both having side and skylights at either end; at either end is a room for the safe keeping of the models and copies.

"In connection with the drill hall there are two rooms for the military officers, and an armorer's room, furnished with a work bench and the requisite tools.

"The extensive basement, besides the space necessary for the steam boilers and the storage of fuel, affords a covered playground for the pupils.

"A part of the English High School basement has been fitted with every desirable convenience for the occupancy of one of the

branches of the Public Library. It is to be hoped that one or two of the basement rooms may be utilized as a refectory where the pupils may obtain a wholesome lunch at a moderate price.

"No chemical laboratory was supposed to be needed by the Latin School, and hence none has been provided; but the provisions for the instruction in chemistry on the English High School side are believed to be as near perfection as has yet been reached, having regard to the objects and grade of the institution. The portion of the block appropriated to this purpose is architecturally a detached building located at the east end of the high school building and facing Montgomery Street, and between it and the southerly end of the drill hall, being separated from the rest of the edifice by fire-proof walls, as far as convenience of access would allow.

"The lower floor is occupied by a lecture room 35 by 40 ft., and capable of seating about one hundred pupils. The room is constructed with rapidly rising tiers of benches and is fitted with a lecture desk and the ordinary appliances of a chemical lecture room.

"On the second floor are the laboratory and accessory rooms. The former is of a general rectangular shape 35 by 30 ft., with an alcove 27 by 7 ft., and is surmounted by a dome-like roof, from the center of which rises a short steeple or cupola. Of the interior arrangements the working benches of the pupils are the chief feature. These occupy the middle area of the room and will accommodate forty-four boys at any one time.

"Connecting with the laboratory are two small side rooms. One is for storage of apparatus, and can be darkened for spectroscopic experiments. The other is a preparing room, but is fitted with working desks and drawers, and is used also as a store-room for chemicals.

ENGLISH HIGH SCHOOL, BOSTON, MASS.
George A. Clough, City Architect.

"Practically the buildings are fire-proof throughout. The corridors are all constructed with iron beams and brick arches, and laid with a finished floor of black and white square Italian marble tiles. The under sides of the arches over the corridors are plastered upon the bricks, and the beams covered with a heavy coating of Keene's cement upon wire network, these corridors, in themselves, dividing the whole block into four fire-proof sections. The several apartments are separated by brick walls, and all the floors and the spaces between the furring upon the walls are filled with fire-proofing. The staircases are wrought or ornamental iron-work, built into the brick masonry.

"The floors and the platforms of the rooms, with the exceptions already mentioned, are of Southern hard pine, while the standing work is of the best white pine, grained and varnished, with the exception of the corridors, where it is painted in parti-color."

In a closing generalization Dr. Philbrick speaks of the leading characteristics of the building and notes features unique in American school architecture.

1. The arrangement of interior light courts.
2. The hall for military drill.
3. Toilet rooms on each floor.
4. Fire-proof construction.

Dr. Philbrick was inclined to the opinion that there could not be a first-class schoolhouse of any considerable size in which the interior court plan is not applied. This cannot be readily accepted, for while the court plan has many merits, it requires great depth of lot if any important rooms are to receive their light therefrom.

Other features are noted as unique at that time in the schoolhouses of this country.

1. The detached location of the chemical building.
2. Sufficient separate room set apart from gymnastic exercises.
3. The provision for conference rooms for teachers, and offices for head masters and janitors.
4. The iron staircases with rubber mats.

Dr. Philbrick's defense of the size of schoolroom adopted is as follows:—

"It remains now to specify with distinctness the leading characteristics of this edifice, which in their combination constitute its superiority over other school buildings heretofore erected in this country, and render it so interesting as a study both by school men and architects.

"1. A mere glance at the plans reveals at once to the eye of the expert the capital peculiarity of this block, which of itself renders it unique in American school architecture, namely, its arrangement around interior courts. This, I believe, is the first instance of the realization of this court plan or idea on a considerable scale in any school building in this country. The most serious defects in our large schoolhouses have resulted from the ignorance or disregard of this idea by our architects. This idea is distinctly foreign in its application to schoolhouses. It is Mr. Clough's great merit that he is the first to give it a practical application in this country. The principle may be thus stated: So plan the building that it shall be in no part wider than the width of a schoolroom with the width of the corridor added. We have college and other educational buildings with wings at right angles to each other, but not planned in accordance with this principle. The superiority of this court plan over what may be called the solid plan, which has hitherto prevailed, is found more especially in the advantages it affords for light and air. So important do I consider this idea in schoolhouse building that I doubt whether there can be a first-class schoolhouse of any considerable size in which it is not applied. The disadvantages of the solid plan may be appreciated by comparing our two most conspicuous examples of it, the Massachusetts Institute of Technology and our Girls' High School, with this block.

"2. The perfection of the schoolrooms is another of the more important characteristics. It has been said that the rooms are not large enough. One might as well say that a bushel measure is not as large as it should be. The rooms are as large as they need be for the objects in view in planning them; and, in fact, a margin was allowed for a change of views with a change of management.

"My conclusion, then, is that the schoolrooms of this edifice, taken as a whole, considering their size, proportion, ventilation, and lighting, place it without rival in this respect among schoolhouses of its class."

The foregoing description makes evident how important the building was in the history of American school architecture, and it will be recognized that many of the features developed in its

construction have greatly influenced schoolhouses subsequently built.

It would have been well if the relatively narrow schoolrooms of high stud here built had been generally adopted in later schoolhouses. The schoolhouses recently built in New York City have these desirable characteristics.

We will consider again the Cambridge High School, in which is found a building preeminently distinguished not only for the beauty of its design, as previously noted, but for the excellence of its plan. The exterior walls of the basement of this building are of Milford granite, and the first story is of Amherst stone, the second and third stories are of light red Perth Amboy terra-cotta brick with trimmings and cornice of Amherst stone. The design and material used in this building are richer than is generally found or is generally advisable even in a high school house. This fine building was built by the city in recognition of the generous public gifts of a former citizen, among

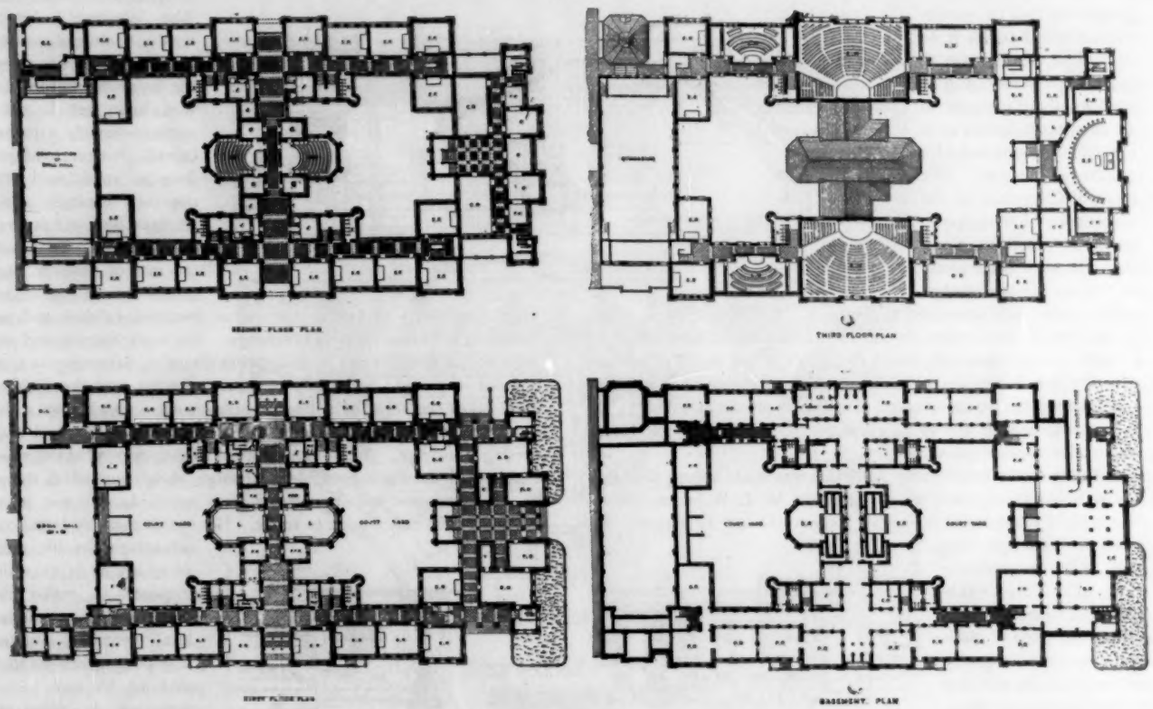
physical apparatus as the pupils personally use, and a working table for the teacher and for advanced pupils or special students.

"3. A chemical laboratory with one hundred and twenty-eight lockers, so that each pupil may have his own equipment and be held responsible for its care. The room contains a chemical hood where a dozen pupils may work at once with noxious gases, also shelves for the storage of such supplies as are in daily or frequent use.

"4. A smaller connecting room with shelves and cases for supplies, books, balances, and the various materials used in chemical study. This room contains a table supplied with gas and water, and is intended for the use of the teacher or of special students under the teacher's immediate guidance.

"5. A small, dark room, with sink, shelves, gas, and electric lamps for photographic purposes.

"6. A large lecture room with a raised floor, and chairs for from



ENGLISH HIGH SCHOOL, BOSTON, MASS.

these gifts being the site for this school. A notable feature of the plan are the "emergency" or "hospital" rooms for use in case of sudden illness. These rooms are provided more especially for the girl pupils. The office of the head master, the library, and the office of the secretary of the board are placed in conjunction, and all these rooms are arranged for library purposes. The books are all placed on open shelves, so that the free use of the library by the pupils is encouraged. The library is not only used as a place for study, but it is sufficiently large to serve at the same time for a recitation room for advanced classes.

In his report the head master of the school gives the following description of the laboratory accommodations: —

"1. A physical laboratory, with a demonstration table for the teacher, chairs with writing-arm attachments for a class when seated, tables with supports for apparatus and lockers for storage, side tables with gas and water.

"2. A smaller connecting room, with shelves and cases for such

one hundred to one hundred and fifty pupils, each chair having a shelf to facilitate the taking of notes. Here the teacher of physics or chemistry, or, in fact, of any subject, may assemble pupils in larger numbers than usual for talks, lectures, and such experiments as are better performed for the pupils than by them. This room contains closets for storage, cases for lecture table apparatus, a well-appointed demonstration table, a stereopticon screen, and a porte-lumiere. Its windows may be darkened at short notice. This room, as well as the five rooms just described, is provided with hot and cold water.

"In addition to the six rooms already described there is a botanical room, with drawers for the school herbarium, cases for botanical specimens, window shelves for plants and water; also a mineralogical room and a spacious drawing room, the latter to receive the tables, models, screens, and other equipment of the evening drawing school."

The school has a capacity of 692 desks.

COOPERATION BETWEEN ARCHITECT, ENGINEER, AND TERRA-COTTA MAKER.

THE CONSTRUCTION OF BALCONIES.

BY THOMAS CUSACK.

WE have taken it for granted that the architect and engineer — individually or jointly, directly, or through capable representatives — have studied the necessary points of contact between terra-cotta, steel, brick walling, and such other materials as chance to intervene. We shall further allow it to go unchallenged that they have agreed upon what appears to them a very satisfactory arrangement. It does not by any means follow that there is no room for improvement, or that it is not open to many, it may be, very serious objections when examined by the terra-cotta maker from a manufacturer's, or by a practical mechanic from a builder's point of view. We have good reason to know that the underlying facts do not furnish an adequate basis for such a hopeful assumption on their behalf. In fairness, however, to members of the professions referred to, let it be said that they do not all lay claim to a monopoly of the inventive faculty, or to an unerring judgment as to everything connected with building practise. The more distinguished of the number would, we suppose, be as ready to disavow any share in such pretensions as they are to acknowledge and act upon duly accredited suggestions. Speaking from an active experience of many years, we can say without hesitation that an architect's success is usually about equal to the use made of his unrivaled opportunities for obtaining the exact measure of things that may look well on paper, or sound plausible as an abstract theory. If he is true to himself and to his client, he will not allow such inestimable advantages to pass unimproved.

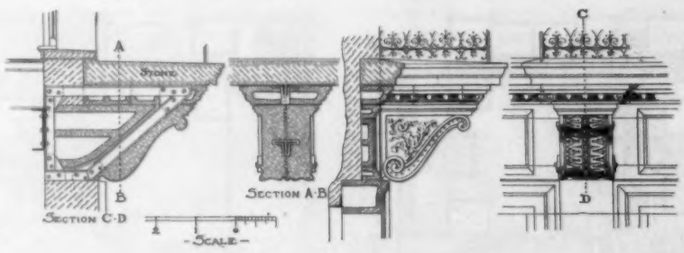


FIG. 53.

A noteworthy indorsement of all this was made a short time ago by the father of skeleton construction, Mr. W. L. B. Jenney, a man whose right to be heard on such a subject will not be disputed by either architect or engineer. One pregnant sentence will suffice: "It is desirable, whenever practicable, to consult with the terra-cotta company before the details are finally settled, as they must furnish and set the material, and sometimes very valuable suggestions can be obtained from them contributing to its stability and economy." Men of assured position can afford to do this, in the way indicated, without the least fear as to their professional dignity. The ablest and most successful among them gladly avail themselves of a privilege which, if enjoyed at all, is not shared to the same extent by the members of any other profession. It is the fledglings and failures that get hopelessly lost, while posing upon a pedestal of unapproachable superiority, making up in supercilious airs what they lack in solid acquirements. There can be no loss of dignity on the part of an architect in seeking to know as much as may be about the practical side of anything on which he is engaged, particularly so while he reserves to himself the undisputed prerogative of approval or disapproval. As applied to the recent development of steel and terra-cotta construction, these remarks have a special significance. It is a new problem, and one of unusual complexity, but the best solution will be found in an unbiased interchange of workable ideas.

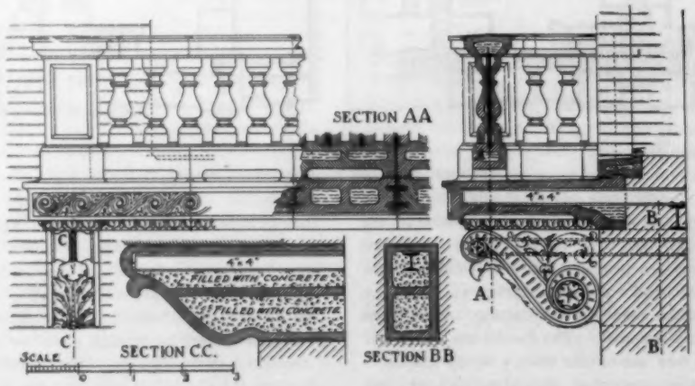


FIG. 54.

The manifold evils resulting from an opposite line of procedure are often costly, and nearly always vexatious. When, for example, an engineer has a balcony or other projecting member to support, he usually sets about it with the uncompromising directness to which he has been accustomed in work of a purely engineering character. The balcony in question, though not a strictly utilitarian adjunct to the building, may be prized by the architect as a somewhat desirable feature in his design; therefore craving a more ornate treatment than would be expected on a mere fire-escape. To that end the iron anatomy must be concealed — probably embellished — by the use of a material in which it is possible to obtain a higher degree of architectural form and finish. The engineer himself would, doubtless, concede as much (in theory) should the point be presented in that light, yet if called upon to modify a preconceived idea, or to depart from an established practise, his leanings would, we fear, be found strongly conservative. To make the use of iron or steel subordinate to that of any other material is to him a doctrine of doubtful validity and one which he is not inclined to encourage. His early training and subsequent associations run in an opposite direction, becoming, in time, a habit of thought not easily overcome. In his eyes the building itself takes the form of a huge cantilever set on end, from which these platform supports must be projected only on approved engineering principles. A certain priority as to the progress of execution enables the contracting engineer to forge ahead unmindful, it may be, of subsequent embarrassments from which he will not, in all probability, be called upon to suffer. Nor is this the only fortuitous advantage, on his side, of which he is naturally disposed to make the most. Fellow-contractors less favorably situated may have reason to complain of his lack of co-operation, in these respects, but as to them he calmly assumes that, "Where sits McGregor, there is the head of the table."

Left to himself, an engineer would provide for the needs of a terra-cotta balcony after the manner shown in Fig. 53. Not only would he frame his triangular support in that fashion; the chances are that, unless restrained by imperative orders, he would likewise make permanent riveted connections between it and the structural framing, thus manifesting an utter indifference to the claims or requirements of any other material. Indeed, we have known this to be done by an eminent member of the fraternity referred to, in the erection of a building on which a number of such balconies occurred, notwithstanding a warning to the contrary

sent by way of anticipation. How this steel triangle was to be inserted in a terra-cotta bracket without first cutting away all the interior partitions and thereby reducing it to a mere shell was an important detail that did not seem to concern him. This was one of the things which he did not understand, and about which he would not take the trouble to inquire until his attention had been called to the oversight by a superintendent of unusual firmness and intelligence. He would not allow the terra-cotta bracket to be mutilated, or its strength in any way impaired, and so the trouble (in this case, at least) recoiled upon those who had caused it. In fact, the heads had to be cut off the rivets, and the steel bracket taken apart so far as to allow the diagonal strut to pass easily through the slot provided for it. The connections were then fastened again — this time with bolts instead of rivets — just as the terra-cotta maker had requested in the first instance.

One other notable circumstance may be mentioned in this connection. It was noticed that while two men were at work undoing a dozen or so prematurely fastened triangles, two other men working for the same firm were as persistently engaged (at another part of the same building) riveting similar brackets in position. They, too, were in turn taken apart for the same reason, to be reconstructed exactly as the first. The man in charge, when spoken to about this curious coincident, explained that they had been "got out that way at the works," and that he would keep on riveting until his present orders had been countermanded. It would seem that "some one had blundered," for though there were a score or more such balconies on the building, he stuck to his text, doing and undoing until the end of the chapter. This was a case of unmitigated red tape plus a predilection for rivets.

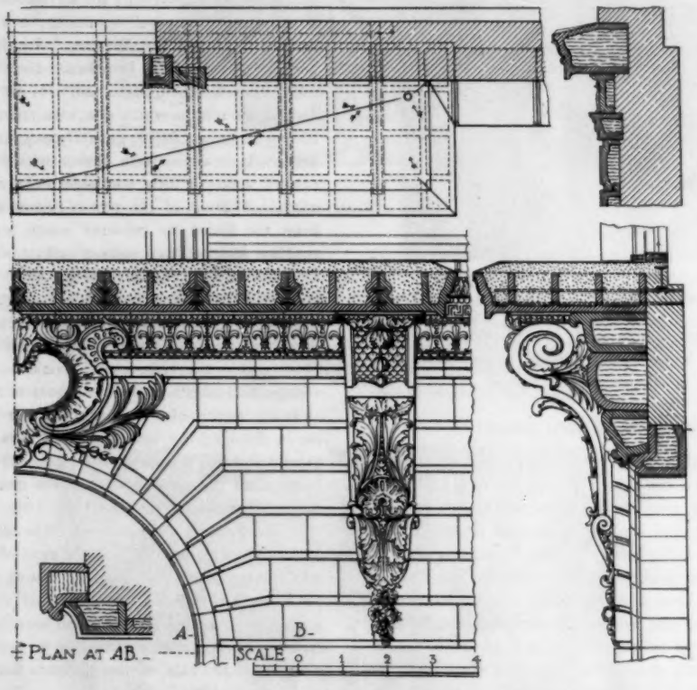


FIG. 55.

The construction of these balconies was in the main quite practicable, and had it been taken up in a spirit of mutual helpfulness neither side would have had any reason to complain. It but required reasonable forethought and intelligence to determine the readiest way in which the several parts of the two materials could be assembled so as to accomplish the final result aimed at by the architect. Work of this kind resolves itself into a well-considered compromise between different materials, each of which has some compensating advantage. To this end there must be mutual concessions, together with a total absence of prejudice on the part of those whose business it is to make the best possible disposition of available resources.

In the particular case under notice we think that these terra-cotta brackets could have been reenforced by a simpler and much less expensive method. Into the upper chamber of each we would have inserted a 3 by 5 in. I beam, the end of which could have extended to within 1½ ins. of the face of bracket. The remaining cavities having then been filled with concrete, the brackets would have been bonded into the 1 ft. 4 in. wall without further ado. The projection would, of course, be shored up until a sufficient countervailing weight of walling had been built on the other end. A balcony so formed would be capable of sustaining at least ten times the weight ever likely to be placed upon it.

In the last example a stone platform was used as a matter of choice, rather than one of necessity. At Fig. 54 we show a somewhat different arrangement, terra-cotta being the material used throughout. The brackets are strengthened in the manner described in last paragraph, not that they really needed any auxiliary support, but as an extra margin of safety. A 5 in. I beam is laid on the top bed, the ends of which extend a foot or so into each jamb of window above. To this is attached the 4 by 4 in. I beams inserted in joints of platform, the blocks themselves forming the fulcrum. These blocks are made with raised joints and a wash towards outlets in the base under balustrade. In each baluster there is a ¼ in. rod which passes through a ¼ by 3 in. continuous bar, for which provision is made in bottom bed of capping. This bar enters the dies, returning at right angles into main wall, thus securing the whole balustrade against lateral deflection.

Turning to Fig. 55, we have a platform over an entrance, calling for another scheme of construction. It, like the preceding example, is one in which the terra-cotta manufacturer had something to say, and that at the invitation of an architect who believes in the principle of co-operation for which we have been contending. In this case it became necessary to provide for a cantilever at every joint, the blocks being molded to fit snugly on the flanges. Considerable leverage is obtained by placing a 5 in. I beam on top of the cantilevers, and across the window openings above, each end extending into wall far enough to receive all the cantilevers. The whole of the blocks having been adjusted to line, resting the while on a level staging, the cellular top bed was then filled solid with concrete graded towards outlets, and floated off in granolithic cement.

Terra-cotta being the material used above the granite base (Fig. 56), the architect, on that account, preferred using it for the platform also. This was quite apart from the question of cost, though the difference between it and stone would have amounted to a substantial item. These ten separate blocks, joined together in the manner indicated, became a monolith of considerable strength, which, being free from joints on the finished surface, could be made to shed water at will in any direction. The principle of composite construction embodied in this example, in which steel and cement are made to supplement the limitations of terra-cotta, is capable of the widest application in modern building practise. Where one is weak the other two are strong, and so the sources of strength outnumber the elements of weakness at the ratio of two to one. How

to obtain the nearest approach to an equation of strength between the several components is an epitome of the whole question. It

FIG. 56.

will be answered best by those who study the physical properties of each, and who have also had a close practical acquaintance with the use of them under exacting diversified conditions.

A NEW TRAVELING SCHOLARSHIP.

CORNELL UNIVERSITY is offering a traveling scholarship to its graduates. "Since," as they say, "there are many objections to the prevailing method of conducting foreign scholarships, viz., that of traveling and making measured drawings, and since there is as much opposition to the idea that Americans must go to France for an architectural education, the Faculty of the College of Architecture has decided upon a course which is at the same time a departure from and a compromise between these two systems." The value of this scholarship will be $2,000. It will be awarded by competition to men under thirty years of age, and the winner will be required to spend two years in advanced studies at Cornell and in Europe under the direction of the faculty. The first of these prizes will be awarded this fall, and others, it is expected, will be awarded on alternate years thereafter. The course pursued differs somewhat from that usually taken in regard to these traveling scholarships. Instead of spending the time in traveling and making measured drawings, or going to France, entering the L'Ecole des Beaux Arts, the holder of the fellowship will spend the first eight months of each year at the university pursuing advanced studies, and four months on a European tour. For the award of this scholarship two competitions will be held. The first has for its purpose the selection of candidates for the second or final competition. The first problem will be one that can be executed at home in ten days, so restricted in size of sheet and elaboration of details that the average competitor can readily prepare his drawing in ten evenings. The second will be executed in four weeks at Cornell University in the College of Architecture. Seven will be selected from the first competition who may compete in the second, and here will be awarded the prize to the successful candidate, and a first and second mention to the two next best.

Brick and Marble in the Middle Ages.

BY G. EDMUND STREET.

CHAPTER IX.

"A sea
Of glory streams along the Alpine height
Of blue Friuli's mountains." — *Childe Harold.*

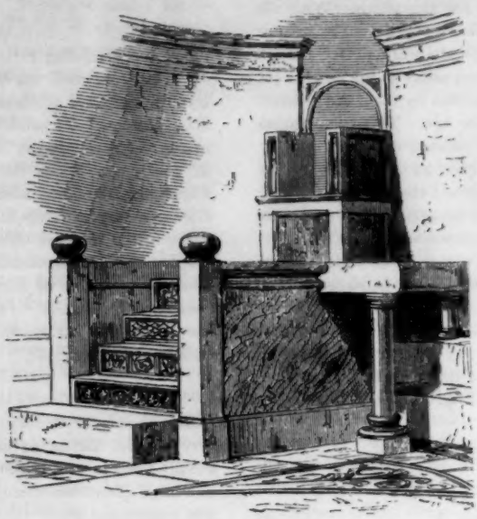
New Roads to Venice — The Pusterthal — Innichen — Dolomite Mountains — Heiligenblut — Kötschach — Kirchbach — Gail Thal — Hermagor — Ober Tarvis — Predil Pass — Gorizia — Aquileja — Grado — Udine — Pordenone.

TO those who wish to find new roads to old haunts let me recommend the road to Venice described in this chapter. A more interesting way for any one who has already travelled through Lombardy to Venice cannot be desired. It affords a sight not only of charming scenery, primitive people, and churches of some interest, but gives an opportunity for a visit to Aquileja, Grado, and Udine, all of them places well worthy to be known by all lovers of architecture. Leaving the Brenner railway at Franzensfeste, we made our way first of all to Innichen. Here I found a very fine Romanesque church which, placed as it is not very far to the north of the distant mountains which one sees from Venice, and full as it is of Italian influence in its general design, may well be included in my notes. It is a cruciform church with a central raised lantern, three eastern apses, a lofty south-western tower, and a fifteenth-century narthex in front of the rest of the west end. The nave is divided from the aisles by columns which are, (1) ten-sided, (2) four half columns attached to a square, and (3) octagonal. The first and third are massive columns decreasing rapidly in size from the base to the capital. The central lantern has an octagonal vault upon very simple pendentives, and the apses have semi-dome roofs. A fine south doorway has the emblems of the four Evangelists, sculptured around Our Lord in the tympanum. Innichen is a small and unimportant village, but boasts, I think, of no less than five churches; and fine as is the mother-church, I suppose most travellers would agree with me in thinking the background of mountains to the south of it, the most delightful feature of the place. Truly I know few things more lovely than the evening view of the church and village, with the tall fantastic peaks of the Dolomite Drei Schuster behind, lighted up with the glowing brilliancy which is so characteristic a result of the Dolomite formation, by the last rays of the setting sun. Below all was gloomy, dark, and shaded; above the whole series of towering peaks seemed to be on fire, and most unearthly did they look. The attraction of such sights as I had seen before compelled me to give a day to an excursion southwards to the Kreuzberg pass, to have a glimpse, at any rate, of the Auronzo Dolomites, and I had no reason to repent the day so spent.

Leaving Innichen and going eastward, we went first to Lienz; then, after a *détour* to Heiligenblut, we crossed from the Pusterthal to the Gail Thal, and from thence across the Predil pass to the Adriatic at Gorizia. From Innichen till we reached the Italian seaboard, we saw and were much interested in a series of churches, generally of the fifteenth century, and all built apparently by the same school of German architects. They are small mountain churches, and are mainly remarkable for the complicated and ingenious character of their groined roofs. They have usually aisles, columns without capitals, and no distinct arches between them, but only vaulting-ribs. The panels between the ribs are often ornamented with slightly sunk quatrefoils, or in some cases regularly filled with tracery.

One of the best of these churches is that at Heiligenblut, in Carinthia. Here, where the main object of every one is the exploration of the mountains grouped around the beautiful snow-peak of the Gross-Glockner, it is not a little pleasant to find again, as at Innichen, a remarkable church just opposite the inn-door. This was built as a pilgrimage church to contain a phial of the sacred blood, and is ex-

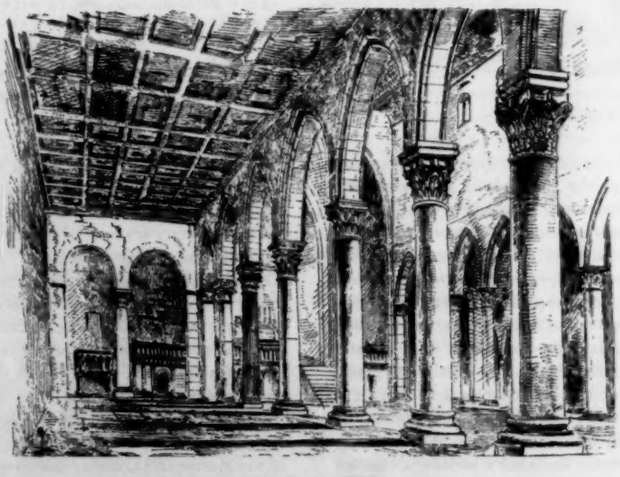
tremely interesting architecturally as a church, built with a regular system of stone constructional galleries round the north, south, and west sides of the nave. The aisles are narrow and divided into two stages in height — both groined — and the upper no doubt intended for a throng of people to stand in, and see the functions below. Now, however, just as in most modern galleries, raised tiers of seats are formed in them, and their effect is destroyed. A pretty Retable at the end of the north gallery suggests that originally perhaps they were built in part to make room for side altars, but this was clearly not the primary object. The fronts of the galleries are covered with paintings of no merit, which illustrate the beautiful legend of S. Briccius, who is said to have brought the phial of blood from the East, and to have perished with it in the snow just above Heiligenblut. There is a crypt under the choir, entered by a flight of steps descending from the nave; a grand Sakramentshaus north of the chancel where the holy blood is kept (not over the altar); and there is a lofty gabled tower and spire on the north side of the chancel, whose pretty outline adds not a little to the picturesqueness of the village.



PATRIARCH'S THRONE, AQUILEJA.

From Heiligenblut, looking at churches by the same hands on the way at S. Martin Pockhorn and Winklern, we made our way back to Lienz, and thence, crossing the mountains, descended on Kötschach in the Gail Thal, passing a good church on the road at S. Daniel.

Kötschach is in one of the most charming situations for any one who can enjoy mountains of extreme beauty of outline, even though they are not covered with snow to their base, nor are more than some nine thousand feet in height. To me this pastoral Gail Thal, with its green fields, green mountain sides, wholesome air, and occasional grand views of Dolomite crags, among which the Polinik and Kollin Kofel are the finest peaks, is one of the most delightful bits of country I have ever seen. At Kötschach the architectural feature is a fine lofty gabled steeple with an octagonal spire. It is very remarkable how German these Germans are! Here, close to the Italian Alps, we have a design identical with those of the fine steeples of Lübeck, and as vigorously Teutonic and unlike Italian work as anything can possibly be.



DUOMO, AQUILEJA.

From Kötschach a pleasant road runs down the valley to Hermagor, another charming little town beautifully placed, and with — no small attraction — a capital hostelry. On the road, at Kirchbach, the drivers of the country waggons in which we were travelling pulled up their horses, to my no small delight, in front of a most interesting mediæval church yard-gate; this is a simple archway overshadowed by a shingled pent-house roof, to whose kindly guardianship we owe it that a fifteenth-century painting of S. Martin dividing his cloak with the beggar, and several saints under craftily-painted canopies, are still in fair preservation on the wayside gate, making one of the most lovely pictures possible on the road.

At Hermagor, where the grand and massive mountain range of the Dobratsch to the east, and the Gartner Kogel to the west, give never-failing pleasure to the eyes whichever way they turn, there is another fine church, very much of the same character as that at Heiligenblut, but without galleries.

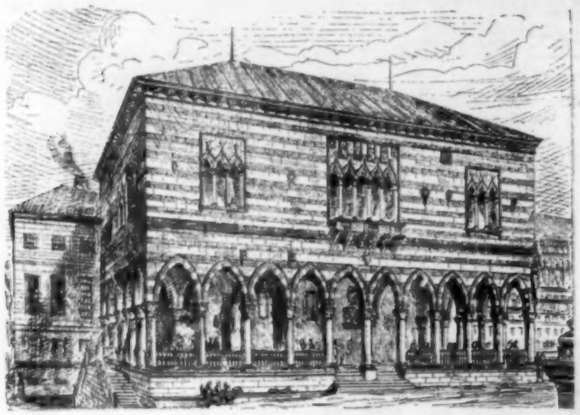
Between Hermagor and Ober Tarvis the churches are not important, but one in the village of S. Paul has the unusual feature of a cornice under the external eaves effectively painted in the fifteenth century, with elaborate and very German traceries in red and buff, which are still fairly perfect.

At Ober Tarvis the Predil Pass is reached; and starting from thence in the morning, passing on the ascent the pretty Raibl See, and on the descent some of the most stupendous and aweful rocky precipices I have ever seen, we reached Flitsch to sleep, and on the following afternoon emerged from the mountains at Gorizia, not far from the head of the Adriatic, after a long and beautiful drive down the valley of the Isonzo.

It is a drive of about a couple of hours from Gorizia to Aquileja. The country is perfectly flat, but teeming with vegetation, and it is not until the end of the journey is reached that one realizes under what baleful conditions life or existence is endured here. A Roman capital and a fragment or two of Roman columns or mouldings are all that one sees at first to show that one is driving into one of the greatest of the old Roman seaports. Here, where before its destruction by Attila in A.D. 452 the population is said to have been about a hundred thousand in number, there are now only a few poor houses, and a sparse population, pauperized and invalided by fever and swamps on every side, whilst the sea has retreated some three miles, and left the place to its misery without any of the compensating gains of commerce. Certainly Torcello is a degree more wretched and deserted, but these two old cities have few compeers in misery, and I advise no one but an antiquary to make the pilgrimage to Aquileja, who is not quite prepared to tolerate dirt, misery, and wretchedness with nothing to redeem them.

The one great interest in the city now is the cathedral. This is a great cruciform basilica, with a central and two small apses east of the transept, and eleven arches between the nave and aisles. The arrangements of the apse are interesting; two flights of steps lead up to it from the nave, and in the centre of the east wall is the patriarch's throne of white marble, well raised on a platform above the seat which goes round the apse. The whole arrangement is singularly well preserved, and looks very well in spite of the destruction of most of the mosaic pavement with which originally no doubt the

floor was laid, of which only a few tesseræ now remain, and in spite also of the modernization of the rest of the apse. This throne appeared to me to be not earlier than circa 1150, though the church is said to have been built between 1019 and 1042. These dates must, I think, be taken with large allowance for alterations. With the exception of the apse and the crypt under it, I believe the greater part of the church was rebuilt in the fourteenth century; for though the Roman capitals (which were everywhere ready to the hand) were used on the ancient columns, the arches carried by them are pointed, and the clerestory is evidently of the same age. This combination of Classic columns and sculpture with pointed arches is so very unusual, that it is quite worth while to give an illustration of the interior. The columns, capitals, and bases are of varied shapes and sizes, and evidently a mere collection of old materials which happened to be handy for the builder's use; the arches are rudely moulded, and the clerestory of cinquefoiled windows, each of a single light, is as insignificant as possible, and yet withal there is so grand an area inclosed that the effect is good and impressive. The nave is divided from its aisles by eleven arches on each side, and measures about one hundred and fifty feet in length, by one hundred and five in width. The aisle roofs are modern, but the nave still retains its old roof, a fine example of a cusped ceiling, boarded and panelled



PALAZZO PUBLICO, UDINE.

in small square panels. The whole of this ceiling is painted, and with extremely good effect, though the only colours used are black, white, and brownish yellow. Each panel is filled with a small painted hexagon filled with tracery painted in black and white, and all the ribs and leading lines are yellow and black. The purlines, which are arranged so as to form the points of the cusps, are very decidedly marked with black. Simple as the treatment is, the effect is admirable, and it appeared to me to be owing to the large amount of white in the panels. Near the west end of the north aisle is a singular circular erection, which is said by the cicerone to be the receptacle for the holy oil, but which without this information I should have taken for the baptistery. It is a perfectly plain circular mass of stonework about fifteen feet across, with a doorway on the west side, a moulded base and cornice, and above the latter a series of detached shafts carrying a second cornice of marble. A square projection on the north side abuts against the aisle wall, and seems to have been the special receptacle for the vessel which held the oil. At present it seems to be as little used and understood by the people of Aquileja as it would probably be if it were in some country beyond the Roman pale; a remark by the way on old church arrangements which one finds oneself making almost everywhere, when one contrasts the intentions of the old builders with the uses to which more modern ideas — reformed or deformed, whichever they may be — are in the habit of applying them.

ON THE EFFLORESCENCES ARISING, NOT FROM THE BRICK, BUT FROM THE SALINE SUBSTANCE OF THE ENVIRONMENT, SOIL, MORTAR, ETC.

BY OSCAR GERLACH (PH. D., BERLIN).

IN the preceding parts of this series I endeavored to give some explanation of the manner in which the white efflorescences on clay products are produced during manufacturing, and I found the main sources of the same to be contained in the iron pyrites resident in the clays and in the fuels used, but I considered only the case in which the bricks themselves contained the efflorescing salts. Experience, however, shows that even bricks that come from the kilns perfectly free from such salts subsequently exhibit efflorescence either in the finished building or even after long storage. Before proceeding to the remainder of my discussion, therefore, I will give a brief explanation of this phenomenon, and for the sake of clearness I will distinguish (1) efflorescences which appear during storage, and (2) efflorescences which make their first appearance in the building.

I.

In most brickworks the bricks are stacked in the open places round about the factory; and since these places are commonly very uneven, and often lie lower than the factory itself, they are usually filled in with ashes and broken bricks. But coal ashes contain large quantities of sulphurous materials, as even the uninitiated will understand from what has already been said, if he but reflect that coal ashes usually contain much lime, magnesia, and alkalies, which, on the combustion of the coal and of the sulphur in the pyrites, are converted into sulphuric or sulphurous salts. The fact is that magnesium and calcium sulphates are to be found in considerable quantities in coal ashes. When, therefore, perfect brick are stacked on places filled in with ashes, that part of the salts in the ashes which is dissolved by the rain or the moisture of the ground will penetrate into the lower layer of the porous bricks and will be carried thence gradually from brick to brick until the whole pile is thoroughly saturated with the salty solution. After the evaporation of the water the salts will be left upon the surface of the products.

II.

For the appearance of efflorescence on perfect brick in buildings we have to seek a different cause. Here the mortar is at fault. Many mortars contain alkalies; that is, carbonate of sodium or potassium in small quantities. These are dissolved by the rain, penetrate into the porous brick, and after the evaporation of the water are deposited on the surface, where the evaporation is most energetic. This is very frequently noticeable in buildings where colored mortars are used. The coloring matter oftenest used for the coloration of mortar is oxide of iron, which is mainly prepared by the roasting of iron pyrites. This oxide of iron always contains easily soluble salts of sulphur — principally ferrous sulphate. These sulphuric salts, on coming in contact with the above-mentioned alkalies in the mortar, are converted into sulphuric alkalies, and these in solution are absorbed by the porous bricks and precipitated on the surface. All these salts, which are very readily soluble in water, are easily washed off by the rain, and, on the bricks becoming dry again, are redeposited on the surface. Here a careful analysis of the mortar and coloring matter is necessary.

Frequently the salts contained in the soil on which the building stands are the cause of the efflorescence under consideration. These salts are most commonly produced by the putrefaction of organic, ammoniacal substances,— for example, the urine in cattle and horse stables,— and the efflorescences in question have actually been oftenest noticed in such buildings. By slow putrefaction nitric ammonium is first formed, which, on coming in contact with the lime in the mortar, is converted into nitric calcium, and so gives rise to the well-known "wall-saltpetre," a name by which many brickmakers still characterize all white efflorescences whatsoever on

bricks. Also the environing atmosphere (for the air sometimes contains ammonium) may be the indirect cause of these efflorescences.

With the foregoing the sources of white efflorescences are practically exhausted. I will now speak of the modes of origin of the green and yellow colorations on buildings. These are almost exclusively found on light-colored bricks. They may be either organic or inorganic in character. When organic, they are caused by vegetable micro-organisms, microscopic Algæ, which find their nutriment in the water of the brick, and consequently grow and increase only where their natural element, water, is present, that is, on parts of buildings which are always more or less moist. They impart to the bricks a green or greenish-yellow appearance, similar to the moss-covered rocks of nature; but the Algæ excrescences are infrequent.

More commonly the green colorations are caused by mineral salts. Their characteristic tint renders them particularly noticeable in the case of buildings constructed of white or light-colored bricks. The coloring passes with time gradually from a yellowish green into a dark green, and finally into blue. It is a serious defacement of a structure, and impairs its appearance greatly.

These green efflorescences have been long known and various explanations of their origin have been given; but the interesting researches of Professor Seeger, of Berlin, first shed light upon what seemed to be an inexplicable mystery.[1] Seeger was the first who accurately determined the chemical nature of the green efflorescences caused by mineral salts. They had been thought to be soluble salts of iron, cobalt, and combinations of chromium, but the coloring element had never been determined definitely. In some cases combinations of chromium have really been discovered, and Seeger also found such. But Seeger first determined beyond a possibility of doubt that the majority of the green efflorescences in question were produced by the presence of vanadic acid salts, which are not decomposed by the heat ordinarily maintained in the kiln. Seeger procured large quantities of these saline efflorescences and carefully analyzed them. His analysis yielded the following results:—

Vanadiate of potassium	44.38
Potassium sulphate	9.01
Calcium sulphate	7.97
Magnesium sulphate	10.02
Molybdate of sodium	1.62
Chloride of sodium	4.47
Silicates	3.82
Water	18.25
Insoluble	0.46
	100.00

In addition to the small quantities of molybdate of sodium, it is principally the large quantities of vanadiate of potassium that produce the green efflorescences we are considering. Why this exceedingly rare element should just happen to occur in light-burning clays, and what its combination is in the unburnt clay, has not yet been ascertained. So much only can be said with certainty, that every bright-burning, fire-proof clay belonging to the carboniferous formation contains more or less vanadium. Noteworthy is it that in the green clay this vanadium is not found as a soluble salt. I lixiviated several pounds of green clay with water and diluted acid, and after evaporation sought to determine the vanadium in the solid residuum. I was unsuccessful. The vanadiates seem to be first formed during the burning of the brick. They may be present in the green clay as a metal or oxide.

Further discussion of these green efflorescences will be given later.

In conclusion I would state that the greenish vanadiates, owing to the minimal quantities in which they appear, have no disintegrating effect upon the brick, whereas the white efflorescences impair not only the appearance of the brick, but also injuriously affect their structure and strength, for their capacity for crystallization gradually induces disintegration.

[1] See Seeger: *Gesammelte Schriften*, "*Grüne und gelbe Ausschläge an Verblendsteinen*"; "*Vanadinverbindungen am Brennkohlenthone.*"

Fire-proofing.

SOME NOTES UPON THE STRUGGLE FOR SURVIVAL BETWEEN BURNT-CLAY FIRE-PROOFING AND ITS NEWLY ARISEN RIVALS.

BY DANKMAR ADLER.

IN the development of industrial, and even in scientific progress, men have always shown a tendency to make an occasional halt in their onward march, and at such times to treat partly developed theories as finalities, and to ignore propositions which, after but another forward step or another forward glance, would have been recognized as axioms. In the light of subsequent discoveries these halts seem to have been altogether unaccountable, while still greater marvel attaches to the tenacity with which otherwise enlightened and progressive men frequently adhere to the positions taken at these times of arrested development. After the forward movement has been again taken up it seems quite incredible that a fetish worship should have been accorded by enlightened beings to crude and half-developed theories, and to the still cruder incorporations of these crude theories into active practise; and it seems still more strange to note the mechanical paradox of an apparent increase of inertia which seems to be in direct proportion to the length of time consumed in any one of these halts. At such times the progressive energy which until then made for continuous movement toward betterment of practise seems to be converted into tenacious adhesiveness to the attained position, and all capacity for carrying out or even entertaining a forward impulse seems to be lost.

In the development of the science and art of fire-retardent construction we have successfully passed one such halting place only to have arrived at another, upon which the forces which originated and developed the known processes of burnt-clay fire-protective covering are resting in placid contentment with the progress attained, reluctant to attempt farther flights into the realm of attainable approach to perfection, and scornful of those who attempt such approach by the aid of other means than those which the tile-maker has already contributed.

For many years after the first appearance in building practise of iron pillars and beams it was believed that a building could be made really "fire-proof" by substituting iron pillars and beams and brick arches for wooden posts, girders, joists, and floors. Disastrous fires at London, Hamburg, Berlin, New York, and Chicago demonstrated the untenability of that assumption. Among the facts brought out by these fires were, first, that combustible chattels and furnishings placed within an incombustible structure still retain their combustibility, and may, if stored in sufficient quantities, be kindled and fanned into an exceedingly hot and fierce blaze; second, that iron, though incombustible, is not indestructible by fire, and that its deterioration under the effects of a hot fire causes results quite as disastrous as would be the burning of wooden structural members supporting the blazing combustible contents of the building of which they are part.

It seemed, then, in all cases where there were conditions which precluded the use of brick or stone piers and vaultings, to be Hobson's choice between the use of wooden structural members which add fuel to the flames of burning contents of buildings, and that of metallic structural members which expand, soften, and collapse under the effects of the heat of burning goods and chattels surrounding them; for in either case the destruction of a building appeared to be a foregone conclusion, if but a fire once obtained a good headway among its contents.

This led thinking and progressive constructors to conceive the idea of completely encasing the structural members of a building with substances at once slow to conduct heat and incapable of destruction or even serious injury by fire.

Almost from the very beginning burnt clay in various forms became the preferred encasing material. It was easy to mold it into the required shapes; it could be made light of weight in the course of its manufacture; it had been exposed to higher temperatures than those of a blazing building; it could be applied by ordinary building artisans at moderate cost and in all weathers. For these and other reasons it took and held possession of the field for many years with but little molestation.

It finally came to be believed that if only burnt clay were used to some extent as an essential part of a "system" of alleged "fire-proof" construction, building and contents were certainly secure against destruction and probably safe from serious injury by fire. But now this belief is assailed by reports of the damage suffered in the course of fierce and long-continued fires by buildings in which burnt clay had been used as fire-proofing material, and still more by fierce and persistent attacks upon burnt clay made by the advocates of other, more recently invented "systems" of "fire-proof" construction, which are so new as not to have had the opportunities of subjection to test in actual conflagrations which have fallen to the lot of older methods.

This tendency toward an anti-burnt-clay heresy may be fought in either of two manners. The first, peculiar to the state of halting and rest upon the road to perfection, is to fall back upon the incontrovertible statement that clay tiles of all kinds, having once been subjected to furnace heat, are indestructible by fire; that the present methods of manufacture and application of clay fire-proofing materials, being sanctioned by nearly a quarter century of practise and experience of manufacture and application, have achieved a status like that of the Thirty-nine Articles or Magna Charta or the Constitution, an attempt to alter which is synonymous with sacrilege, heresy, and treason; and that if there are observed facts which show that there may be buildings so constructed that the burnt clay used in them fails of making them fire-proof, why, then so much the worse for the facts. Fortify this position with a circumvallation built up of desires to save innumerable obsolete, rusty, rickety manufacturing plants, which have earned their first cost over and over again, but which are carried on manufacturers' inventories at their first cost together with all repairs and tinkerings since their first origin upon the plain of Shinar, and the champions of burnt-clay fire-proofing processes may make a defense as stubborn as that of Thermopylæ, but their cause will be lost and their territory overrun and despoiled by the enemy.

There is another, less sentimental and less romantic, way of facing the attack and of reestablishing and maintaining the claim that burnt clay is in most instances the most reliable material that can be used as a fire-protective covering of the structural members of buildings. In organizing and marshaling the forces of the burnt-clay industries in the offensive-defensive warfare which its friends must wage until their former position is reconquered, there is no room for maudlin, self-laudatory memories of the bloodless victories won in the past, of the hundreds of buildings, the square miles of floors, the hundred thousands of pillars and beams in and upon which burnt clay has been used as a fire-proofing material in the days when none other had been thought of; nor is it allowable to consider tenderly and reverentially the perpetuation of the plans and plants, the machines and dies, the processes and instruments by means of which the burnt-clay fire-proofing industry was established and maintained before its wicked and unscrupulous enemies had had the temerity of proposing the substitution of materials and processes wrongfully, of course, but yet plausibly, vigorously, and persistently vaunted as superior to burnt clay in its every shape. Nothing should be thought of but the aim to so profit by the lessons of the past as to eliminate from burnt-clay fire-proofing practise every imperfection developed by experience and incorporate in it every improvement suggested by thoughtful ingenuity and aggressive enterprise.

As the battle stands now, the age and general adoption and application of the various processes of burnt-clay fire-proof construction have become an element of weakness, while the apparent strength of other systems and processes appears to lie chiefly in their novelty and in the comparatively limited range of their practical application to actual building operations. The number of instances in which the former have been exposed to the destructive efforts of fire is necessarily much greater, and therefore, also, the number of opportunities for showing the existence of weakness and imperfection, than can in the nature of things be the case with the more recently developed systems, whose champions, however, are quick to observe and expose every tendency to failure under stress of actual use of the older material, the reputation of which they aim to destroy.

If those interested in the maintenance of the not yet altogether destroyed preference for burnt clay as a fire-proofing material will read and learn the lessons taught by the exposure of their material to fire under varying conditions and methods of attack, it will give them a great advantage over their newly arisen rivals, whose materials and processes will, ere long, begin to show in the light of subjection to actual conflagrations many shortcomings and failures to attain ideal perfection, as is the lot of all that is created by the spirit and the hand of man. By the time the conduct under fire of the newer materials and processes will have begun to amaze and horrify their friends, there will have been many corrections of defects which the experience of years will have shown, and which the criticism of rivals and enemies will have pointed out as latent in burnt-clay fire-proof construction, and this industry will have been established on a firmer footing than ever before.

But before the arrival of that day there will be many exasperating experiences. There are dozens of buildings, particularly in New York, in which hollow-tile arches have been used for floor construction, in which pillars, girders, and beams have been left exposed in whole or in part. There are scores of buildings throughout this country in which the burnt-clay coverings of bottom flanges of beams, or the enclosures of pillars are inadequate, and fully as many in which the integrity of the fire-protective covering of important structural members has been seriously impaired by the manner in which wooden grounds, and blocks, and conduits, and insulators made of highly inflammable materials have been applied and introduced. There are altogether too many instances of acres of floor space supported by burnt-clay protected pillars and beams, but covered by inflammable fixtures and chattels, and enclosed chiefly by sheets of glass in wooden frames, unprotected by shutters and exposed to attack by fire from without. There cannot help but be many more cases of serious injury to the fire-protective covering of such structures, and these will be considered as condemnatory of the material burnt clay and not of the manner in which it is applied, unless the friends of burnt clay begin to combat erroneous and injudicious use and application of their materials even more earnestly and vigorously than they may fight the efforts to substitute other materials and processes for their own.

It is, therefore, essential that thoroughgoing study be made of the damage which the ordeal of fire has inflicted upon clay fire-proofing materials, of the causes of such damage, and of the means by which it be prevented in the future. Of the injuries noted, some were due to the introduction, as in the building of the Chicago Athletic Association, of wooden strips between the individual blocks of hollow tile; others, to absence of protection upon important structural members, as was the case in the Western Union Building of New York; or, again, as in the Horne Building, at Pittsburg, the harm suffered seems to have been due to an effort apparently made to combine a maximum of exposure to attack of fire from without, with a maximum aggregation of combustible material within the building, and the opposition to this of a protective covering of burnt clay barely sufficient to meet the minimum of fire danger characteristic of the ordinary office building. That the Horne Building remained, for the most part, structurally intact is, therefore, in itself a victory for burnt clay, even if the general design of this building intended to be "fire-proof" was a disgrace to its author.

(*Continued.*)

The Masons' Department.

CERTAIN RIGHTS OF THE CONTRACTOR.

THE average building contractor is so accustomed to look out for himself, and, we must admit, is so perfectly able to do so, that we do not always bear in mind some of the rights which are undoubtedly his, but which are very often not insisted upon; and the scramble for work, especially in these dull times, is so pronounced that we imagine an architect can easily fail to appreciate how much it means for a contractor to be spending his time week after week figuring new work, none of which may come his way. There have been at different times a few spasmodic attempts to so alter the present system for making tenders for work that there would be an opportunity for some compensation to be awarded to unsuccessful bidders. At one time it was proposed that each of the contractors who were invited to figure should add a certain percentage to his bid, the one to whom the contract is awarded to divide this percentage among the unsuccessful contestants. One of the strongest of the trade associations in this city has, if we are rightly informed, carried such a scheme into practical effect for a number of years with eminently satisfactory results. But as this particular association limits its work to a technical portion of building operations and includes in its ranks practically all who follow this line in this city, it is easier to regulate such a practise than it would be in the case of the general contractors, who often have to compete with every one, and on all sorts of terms and conditions. It would really be fair that when a contractor is called upon to spend several days in carefully estimating the cost of a structure, the owner, who thereby gets the benefit of selection from several bidders, should be willing to pay a small compensation for the opportunity, though just how this can be brought about is a question which is not easily solved. There are a few considerations, however, that would certainly lighten the task of the unsuccessful bidder, without laying any serious burden upon either architects or owners.

It ought to be an inflexible rule with an architect that no contractor should ever be allowed to change his bid after it has once been submitted in writing. If the builder is to feel that the owner, by applying moral suasion, can expect him to cut off five, ten, or fifteen per cent., he will, if he is human, add that amount to his bid in the first place, and take his chances on being the lowest, and it is believed that by adhering strictly to a rule of this sort the architect would get lower bids in the first place, and would take a higher rank in the opinion of the competitors.

Another slight act of courtesy can make relations much more pleasant. Ordinarily when a builder submits a tender for work he thereupon goes his way and may not know for weeks, or even months, who is to do the work. Just as soon as any decision is reached, each one of the bidders ought to be notified that the contract has been awarded to so and so under certain conditions, and appreciation expressed of the services of the bidder in figuring. This is not money compensation for estimating, but it is a matter of courtesy between the architect and the builder, which one owes to the other. The architect cannot build a building without a builder, though the builder might put up a structure without an architect, but anything which brings the two more closely together is of unquestionable advantage. The line between architect and builder is at best a faint one, and the amenities of civilization can well be studied as a branch of architecture.

STRENGTH OF CONCRETE.

A SUBSCRIBER submits the following query to THE BRICKBUILDER for an answer: "Will you kindly inform me through your journal as to the bearing strength of concrete, or the proportionate thickness to the width?"

This query is somewhat indefinite in form, and it must be answered as two separate propositions, one as to the compressive strength of concrete, and the other as to the necessary proportion of width to thickness.

Some recent tests of the strength of concretes, prepared from different cements and aggregates, have been conducted by the Engineer Department of the District of Columbia, and the results are published in the Report of the Operations of this Department for the year ending June 30, 1897, and may be found in full on p. 165 of that report. A synopsis of these results is given in the following table: —

TABLE G.

No.	Composition of Concretes, by Volume	10 days.	45 days.	3 mos.	6 mos.	1 year.
	1 PART NATURAL CEMENT, 2 PARTS SAND.	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.
1	6 parts average concrete stone	32,900	77,687	54,022	114,412	151,700
2	3 parts average concrete stone, 3 parts gravel	15,500	52,362	85,313	90,965	121,100
3	4 parts average concrete stone, 2 parts gravel					131,700
4	6 parts (¾ average concrete stone, ¼ granolithic)					115,200
5	6 parts average gravel	12,500	60,652	51,980	49,437	109,900
6	6 parts coarse concrete stone (no fine)			85,880		119,300
	1 PART (ATLAS) PORTLAND CEMENT, 2 PARTS SAND.					
7	6 parts average concrete stone	130,750	[1]343,530 172,325	324,875	361,600	440,040
8	3 parts average concrete stone, 3 parts gravel	136,750	266,962		298,037	396,200
9	4 parts average concrete stone, 2 parts gravel					408,300
10	6 parts (¾ average concrete stone, ¼ granolithic)					388,700
11	6 parts average gravel	99,900	234,475	385,612	265,550	406,700
12	6 parts coarse concrete stone (no fine)			234,475	220,350	266,300

Additional information is also contained in Baker's *Treatise on Masonry Construction*, p. 109, from which it appears that hydraulic concrete, made in various ways with natural cement, may have a compressive strength of from 65 to 85 tons per square foot in cubes at an age of six months, and with Portland cement a strength of from 144 to 219 tons, results which do not differ largely from those obtained in Washington.

The necessary relation of thickness to width of any concrete mass cannot be fixed by any general rule, but is dependent upon the particular conditions under which the concrete is used. If the concrete is to form the footing for the support of a wall or pier, the relation of thickness to width will depend upon the nature of the soil or foundation upon which the concrete is laid and the amount of load that it is to carry. Each particular case must, therefore, be considered by itself. For piers for the support of heavy machinery the concrete may be several times thicker than wide, whereas, as a base for pavements, it may be made many times wider than thick. For any particular case the relation can be determined from the strength of various concretes previously given.

LIMESTONE IN CONCRETE INJURIOUS TO IRON?

AT the last meeting of the American Society of Civil Engineers, Mr. L. L. Buck stated, as reported in our last issue, that limestone in concrete, applied to iron or steel surfaces, would certainly cause deep corrosion of the metal wherever the stone came in contact with the metal. In the anchorages of the Niagara railroad suspension bridge, the strands of the main cables were imbedded in a concrete made with limestone, and wherever the spalls touched the wires the latter were badly eaten and sometimes entirely severed.

This is a matter of such importance that it deserves careful attention, particularly in view of the use of limestone in concrete laid in connection with the structural metal work of large buildings, where corrosion can be detected only with much difficulty. There is a wide variation in limestones, and it may be that some grades will act corrosively and others not; it is desirable that this point should be borne in mind in discussing the subject. — *Eng. Record.*

[1] There being such a great difference in the crushing of the two cubes, the strength of each cube, and not the average, is given.

Brick and Terra-Cotta Work In American Cities, and Manufacturers' Department.

NEW YORK.— There seems to be an impression in all parts of the country that business in New York is entirely suspended and that the greatest uneasiness and excitement prevails. Such, however, is not the case, and it is really surprising, in view of existing circumstances, that everything is running along so smoothly. There is naturally some excitement and business is "quiet," but not suspended by any means. The exchanges are very active in buying and selling and a healthy tone prevails. Of course, most large building enterprises are being temporarily postponed, but owing to recent encouraging reports and the prospects of an early cessation of hostilities it cannot be for long. The work on smaller buildings and residences seems to be progressing favorably.

BRACKET IN MAIN CORNICE, CHAMBER OF COMMERCE BUILDING, CLEVELAND, OHIO.
Executed by the Northwestern Terra-Cotta Company.
Peabody & Stearns, Architects.

A great source of annoyance at the present time is a strike among the stone-cutters which has been in force for several weeks. It has almost caused a cessation of work on the great thirty-story Ivins Syndicate Building, on Park Row, which it is intended to have ready for occupancy in September.

The National Sculpture Society is now holding its third annual exhibition in the Fine Arts Society Building, 215 West 57th Street. This is by far the most ambitious exhibition which the society has yet attempted, and should be of great interest to the general public as well as to architects and sculptors. The growing friendliness and cooperation between architects and sculptors is very gratifying and gives promise of future works in which the two arts will be jointly represented, each enhancing the beauty of the other. Among the few important items of news among architects may be mentioned: —

Plans have been prepared by York & Sawyer, architects, for a new building for the Franklin Savings Bank to be erected at 658 Eighth Avenue. The building will be of brick and stone, and will cost $200,000.

Ludlow & Valentine, architects, have prepared plans for a five-story brick and stone store and office building to be erected on East Ninth Street; cost, $200,000.

Edward H. Kendall, architect, has planned an eight-story brick and stone office and printing house for the Methodist Book Concern.

N. C. Mellen, architect, has planned a four-story brick and stone dwelling to be erected on Madison Avenue; cost, $130,000.

Cleverdon & Putzel, architects, have prepared plans for four five-story brick dwellings to be erected on 76th Street, at a total cost of $160,000.

Carrere & Hastings, architects, have planned a five-story brick and stone dwelling to be erected on Fifth Avenue, near 72d Street.

DETAIL, NEW YORK AND NEW JERSEY TELEPHONE BUILDING, BROOKLYN, N. Y.
Executed by the Perth Amboy Terra-Cotta Company.
R. L. Daus, Architect.

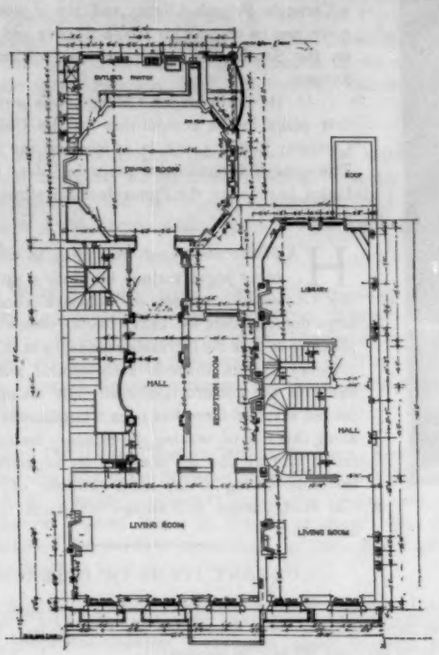
Dehli & Chamberlain, architects, have planned a new building for the Church of the Good Shepherd, Brooklyn. It will be a brick and stone structure and will cost about $40,000.

CHICAGO.— The writer knows of a building enterprise in New York which, a few months ago, could have obtained on its exceptional security a loan of $30,000 at 4½ per cent. Now, however, operations are suspended until the money market can determine its own emotions on the war with Spain. Similar conditions prevail in Chicago. Recently a loan at 4½ per cent. was announced on property located, it was noted, outside of the business center of the city. Not long afterward a better loan on property in the heart of the business district was held up at 6 per cent. As this indicates, many building projects are awaiting the outcome of the war.

About a year ago the Chicago Architectural Club gave up its club house and moved into the Art Institute Building. They and the Caxton Club (an organization of book cover connoisseurs) were the first to take advantage of the new policy of the Art Institute, to gather within its walls a group of clubs interested in art. Now the Illinois Chapter of the Institute of Architects has done likewise, and without any cost save the taking out of membership tickets in the

CAPITAL FOR OFFICE BUILDING, HOLYOKE, MASS.
Executed by the Standard Terra-Cotta Company.
Clough & Reid, Architects.

Art Institute for each member of the Chapter. It possesses headquarters in our temple of art, which, with its art school of twelve hundred, its fine galleries of painting and sculpture, its school of architecture, and close affiliation with the Armour Institute of Technology, and, finally, its group of art clubs, ought certainly to be the center of a strong art influence in the West.



FIRST FLOOR PLAN.

HOUSES FOR JAMES J. GOODWIN, ESQ., 54TH STREET, NEW YORK.
McKim, Mead & White, Architects.
Elevation shown on plate 34.

In the line of building news there is not much at present concerning tall office buildings. One fourteen-story building, 50 by 68, is to be erected on the site of a building recently burned.

Holabird & Roche have a business building 100 by 100, two stories high, "chiefly glass." Some important manufacturing plants are in the prospective stage. Wilson & Marshall have in hand extensive alterations to Hooley's Theatre. The question of a new court house is being agitated again. Some new public schools and city pumping stations are projected. The showing of the building operations for April is less, based on the permits, than for the previous month, or for the corresponding month last year.

Active measures are being taken by the Central Art Association, in behalf of the trans-Mississippi Exposition, "to erect, furnish, and decorate a modern $10,000 house containing ten rooms, wherein will be used the most approved building material of the present time. The following committee of architects, Geo. R. Dean, Frank L. Wright, and R. C. Spencer, Jr., has been selected by the Central Art Association to design a home which may be considered typical of American architecture." It is to be hoped that this project will be successful in every way, and that material dealers will contribute generously to make it so.

Apropos of a scandal referred to last month concerning an improperly constructed building which recently burned, it is interesting to note that the new city building ordinances hold architects responsible thus: "Any architect having charge of such building, who shall permit it to be constructed in violation of this ordinance, shall be liable to the penalties herein provided and imposed." However much architects may be overridden in matters of taste, they should be held fully responsible as professional men in matters of construction.

PITTSBURGH.—After the general complaint of the scarcity of work which has come from architects and contractors so far this year it is rather surprising to learn at the office of the building inspector that during February, March, and April three hundred and fifty-seven permits have been issued against three hundred and seventy-nine during the same period of last year, while the valuation of the work of this year has been nearly half again as much as that of the same period of 1897.

The first exhibition of the Pittsburgh Chapter of the American Institute of Architects was opened at the Carnegie Art Galleries on Saturday evening, April 30, by a reception to members and friends. The exhibit is a most excellent one and comprises most of the best drawings seen in New York, Philadelphia, and Chicago this year. Its general excellence is not due, however, as one of our daily papers would have us believe, to the large size of the drawings; this paper remarks that it is very impressive, "many of the drawings being quite large, many as large as 8 by 2 ft.!" Everything is being done to have the exhibition visited by the public, as it may be made an important factor in the education of the architectural taste and criticism of the community. Among some of the most attractive drawings may be mentioned Cope & Stewardson's drawings for the Pennsylvania Institute of the Blind; the designs for the National Academy of Design Buildings, by Babb, Cook & Willard; the drawings of the Mt. Aloysius Academy at Cusson, Pa., by Alden & Harlow; the interiors by Nicola d'Ascenzo; and the exhibits from the Massachusetts Institute of Technology and the University of Pennsylvania. There are also many attractive sketches, notably those of Frank A. Hays, the pencil sketches by H. A. Woodbury, a charming sketch of a suburban residence by Howard Shaw, and the pen and ink drawings of Joseph Pennell. There are also shown the drawings received in the competition lately given by the Pittsburgh Chapter for an entrance to Schenley Park. The prize, $500, to be expended in a year at some architectural school, was awarded to C. C. Mueller.

The opening exercises were also made the occasion of the unveiling of a life-sized bronze bust of the late J. D. Bernd, a prominent merchant of Pittsburgh, who left the Carnegie Library some $20,000 to be expended on architectural books.

CAPITAL SPINGLER BUILDING, NEW YORK CITY.
Executed in gray terra-cotta by the Excelsior Terra-Cotta Company.
W. H. Hume & Son, Architects.

Among buildings now in process of construction or soon to be commenced may be mentioned the new department store for Kaufmann Brothers, to be built of brick and terra-cotta, Charles Beckel,

MAIN ENTRANCE, CITY HALL, PATERSON, N. J.
Showing Guastavino system ceiling.
Carrere & Hastings, Architects.

architect; the First United Presbyterian Church, to be built in Oakland, Thomas Boyd, architect; the large new Mother House for the Sisters of the Third Order of St. Francis, of brick and stone,

TERRA-COTTA DETAIL, HARTFORD TIMES BUILDING, HARTFORD, CONN.
Executed by the Conkling, Armstrong-Terra-Cotta Company.
A. W. Scoville, Architect.

S. F. Heckert, architect. Mowbray & Uffinger, of New York, have made plans for the new East End Bank, to be built of white marble, cost about $70,000. Alden & Harlow have recently let the contract for a Carnegie Branch Library and are at work on two more, one to be built on Wylie Avenue and the other on the South Side, estimated cost of each about $30,000.

D. H. Burnham, of Chicago, was awarded the first place in the competition for the Union Trust Company Building, and is at work on the drawings. The same architect is also preparing plans for a new Union Station for the Pennsylvania Railroad, to cost $500,000.

HAVING illustrated from time to time in our other pages various interesting problems in the Guastavino system of cohesive construction, large domes, floors for heavy loads, roofs, etc., it is a pleasure to note the increasing tendency in this strictly masonry system towards architectural and artistic effect in the construction itself. By means of improved material there has been a continuous advance along this line of making the masonry its own decoration, and we can see some of its capacities in the vestibule ceiling of the main entrance of Paterson City Hall, Carrere & Hastings, architects, illustrated herewith.

CURRENT ITEMS OF INTEREST.

ST. LOUIS SEWER PIPE MANUFACTURERS have been figuring on three hundred car loads of sewer pipe for Guadalajara, Mexico; also a large contract for city of Mexico.

DYCKERHOFF PORTLAND CEMENT was used to cover the Assabet Bridge, at Northboro, Mass., built by the Metropolitan Water Board. The bridge is 329 ft. long by 189 ft. wide.

THE BURLINGTON ARCHITECTURAL TERRA-COTTA COMPANY are supplying the terra-cotta for twelve houses for F. A. Potter & Son, at Philadelphia, H. E. Flower, architect.

THE BERLIN IRON BRIDGE COMPANY have just completed for the Conway Electric Street Railway Company, at Conway, Mass., a steel bridge 300 ft. in length, to carry their electric line across the Deerfield River.

WALDO BROTHERS are furnishing the face bricks for a residence front at Worcester, Mass., L. E. Gironard, contractor. These bricks are manufactured by the Ohio Mining and Manufacturing Company, Shawnee, Ohio.

THE BERLIN IRON BRIDGE COMPANY, of East Berlin, Conn., have just completed a fire-proof boiler house for the Hendey Machine Company, of Torrington, Conn.; also a new fire-proof casting shop for the Whitin Machine Company, of Whitinsville, Mass.

THE contract for the Lincoln Trust Building, 7th and Chestnut Streets, St. Louis, has been let to McArthur Brothers, of Chicago, D. H. Burnham, Chicago, architect; cost about $400,000. Face bricks are called for.

WALDO BROTHERS report that they are supplying Atlas Portland cement for municipal work in the following cities: Boston, Providence, Worcester, Haverhill, Quincy, Somerville, Brookline, Everett, Melrose, Malden, and Medford.

THE lining of the easterly walls of the Scollay Square station

of the Boston Subway has been awarded to the Grueby Faience Company. This makes the fourth station of the Subway in which their goods have been used.

THE AMERICAN ENAMELED BRICK AND TILE COMPANY will supply, through their New York agents, Meeker, Carter, Booraem & Co., the enameled brick and glazed terra-cotta in the new Post-Office building at Paterson, N. J., McIlvaine, Unkefer & Co., builders.

THE STANDARD TERRA-COTTA COMPANY are supplying the architectural terra-cotta for the Press Building, Philadelphia, T. P. Chandler, architect; also for the new building for the Union Gas Company, at Point Breeze, Philadelphia, Wilson Brothers & Co., architects.

THE WINKLE TERRA-COTTA COMPANY is furnishing the terra-cotta work for interior and exterior of Ohio, Minneapolis & St. Paul Railway Station, Minneapolis, Minn., Charles S. Frost, architect. They are also making terra-cotta for Lincoln Trust Building, St. Louis, Eames & Young, architects; George A. Fuller Company, contractors.

MEIERS PUZZOLAN CEMENT (Waldo Brothers, New England agents) is being used in the Somerset Hotel, Commonwealth Avenue, Boston, A. H. Bowditch, architect; and in the Westminster Hotel, Copley Square, Boston, Henry E. Cregier, architect. This cement is also specified for the light stone work on Back Bay Station of the N. Y., N. H. & H. R. R.

THE BRICK, TERRA-COTTA, AND SUPPLY COMPANY, M. E. Gregory, proprietor, Corning, N. Y., have closed contract for the brick and terra-cotta required for Mrs. S. L. Gillett's residence, Elmira, N. Y., Pierce & Bickford, architects. They also have contract for the terra-cotta required for Parochial School, Elmira, N. Y., J. H. Considine, architect.

THE BOSTON FIRE-PROOFING COMPANY are fire-proofing the following new buildings in Boston: Store building, corner Bedford and Chauncy Streets, Winslow & Wetherell, architects; George A. Fuller Company, contractors; building for the Boston Electric Light Company, Whidden & Co., contractors; American Express Company's new building, Prescott & Sidebottom, architects; L. P. Soule & Son, builders.

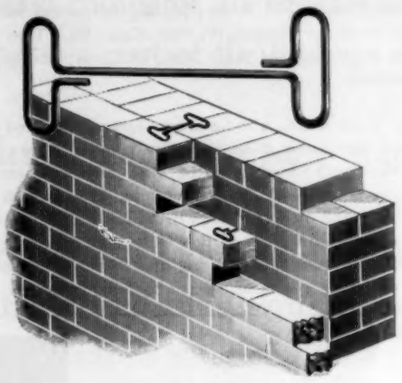
AMONG the new buildings recently supplied with brick by the Columbus Brick and Terra-Cotta Company are: Stores and apartment house for George H. Matchett, at Cleveland, Ohio, Robert Crabb, architect; theater and music hall at South Bend, Ind., Dirham & Schneider, architects; new high school building at Columbus, Ohio, D. Riebel, architect; and residence at Columbus, Ohio, for W. Y. Miles, J. E. Elliot, architect.

THE following buildings have just been equipped with the "Bolles Revolving and Safety Sash": New York and New Jersey Telephone Building, Brooklyn, N. Y.; New York Telephone Building, 15 Dey Street, New York City; New York Telephone Building, 18 Cortlandt Street, New York City; Cushman Building, Broadway, New York City. The sash for the tallest office building in the world (Park Row Syndicate Building) is now being fitted with the Bolles fixtures.

THE STANDARD TERRA-COTTA COMPANY, through their New England agents, O. W. Peterson & Co., have recently secured contracts to furnish the terra-cotta for the following buildings: The Science Building, Springfield, Mass., Gardner, Pyne & Gardner, architects; a business block at Holyoke, Mass., Clough & Reid, architects; Taylor's Theater, Worcester, Mass., Fuller, Delano & Frost, architects; Thomas Barrett, builder; Wilder and Moore Halls, Dartmouth College, Lamb & Rich, architects.

THE QUEEN SASH BALANCE COMPANY, of 150 Nassau Street, New York City, whose overhead window pulleys have gained a world-wide reputation, are finding great success in placing on the market an improved window stop adjuster which they have just patented. The adjuster consists of a small bronze cup with a corrugated base having an oblong opening, and a corrugated washer to fit the corrugated base, which allows a screw to pass through it and thus holds the stop bead absolutely rigid. Samples and catalogue will be furnished upon application.

THE CLEVELAND WIRE SPRING COMPANY, of Cleveland, Ohio, are placing upon the market a line of patented steel wall ties



for bonding pressed or enameled brick facings, hollow walls, terra-cotta blocks, etc., which will, we believe, find favor among architects and builders as being practical and valuable. The claim is made that, being perfectly flat and the formation such, — without spring, — they form a direct lock that bonds perfectly. The accompanying illustrations give a good idea of the exact manner in

which these ties are used. The same company has also an improved wire snow guard for slate and shingle roofs. Catalogues which include price-list will be sent on application.

VESSELS of the United States Navy are being equipped with the Mason Safety Tread, the Department having approved of this

material as being well adapted to secure protection to the sailors under conditions where, to the ordinary danger of slippery treads, is added the instability caused by rough seas and constant motion. Among the vessels for which orders have been given for entire or partial equipment with Mason Treads are, the *Brooklyn*, *Iowa*, *Indiana*, *Minneapolis*, *Columbia*, *Kearsarge*, *Kentucky*, *Bancroft*, *Lancaster*, *Lebanon*, and *Southery*. Mason Treads prevent wear and slipping whether on land or sea.

THE DAGUS CLAY MANUFACTURING COMPANY shipped upwards of five hundred thousand bricks during the month of March. Among contracts recently closed is a residence for George B. Ensworth, Warren, Pa., C. M. Marston, architect; to be built of dark buff with dark pink trimmings; residences for William V. Eisenberger, Lancaster, Pa., and G. L. Lawrence, New York City, Dagus fire-flashed Pompeian tile; a building of light buff brick for John Westenberger, Lancaster, Pa. They are working upon an order of mottled pink for John W. Reith, Lancaster, Pa. They also furnished dark gray brick for a barn for Dr. John A. Ritchie, Oil City, Pa., and have delivered to the B. N. McCoy Glass Works one hundred and fifty thousand light buff brick for an addition to their factory building at Kane, Pa.; also forty-seven thousand dark red front brick for Thomas W. Poy, Kane, Pa. They report the season as having opened fairly well with prospects of continued trade excellent.

J. B. COLT & CO., who for many years were located on Nassau Street, near Ann Street, New York City, removed May 1 to Nos. 3, 5, and 7 West 29th Street, corner of Fifth Avenue, where they have considerably more room than heretofore, in a very much better neighborhood, and with very much better facilities of all kinds.

It is the leading firm of the United States engaged in the manufacture and sale, at wholesale and retail, of educational and scientific projection apparatus, electric focusing lamps, etc.

Since acetylene gas became a factor in illuminating work, Messrs. Colt & Co. have made a special feature of acetylene generators, and for such appliances they are now recognized as headquarters. They have very completely equipped acetylene gas show rooms at 125 West 37th Street, corner of Broadway, where the capabilities of the new illuminant are being fully set forth to a multitude of visitors every day.

The business of the house was originally founded in 1870 by Mr. James Bennett Colt, the present senior partner. In 1888 Mr. Charles Goodyear became a partner, and these two gentlemen constitute the present firm. The firm has branches in Chicago and San Francisco, and its business extends literally to all parts of the country.

NOTICE OF INJUNCTION.

The demand for our goods has induced certain parties to imitate our trade-marks for the purpose of fraudulently deceiving our customers and profiting by our reputation. We recently brought suit against the New York Metallic Paint Co., Fred. Lederer and Walter T. Klots, respectively, the President and Treasurer of said company, to restrain such fraudulent practises. This case was tried, and the following is a part of the findings which have just been signed by Judge Gaynor, viz. :—

"That] the said defendants (the New York Metallic Paint Company) entered into the manufacture of said pigments and adopted the words 'Metallic Clinton Paint' printed upon the representation of a barrel head, for the *fraudulent purpose* of causing the customers of the plaintiff in particular, and all others, to confound the defendants' pigment with that of the plaintiff, and thereby enable the defendants to get the trade of the plaintiff."

A similar finding was also made with respect to "Clinton Hematite Red."

Judge Gaynor also decided that we were entitled to an injunction restraining the defendants from using the words "Clinton Hematite Red" and "Metallic Clinton Paint" printed upon the representation of the head of a barrel, or any colorable imitation thereof, as well as to all profits of the defendants upon goods sold by them, bearing imitations of our labels and trade-marks, and to such damages as we may have "suffered by reason of the defendants' unlawful use" of our labels and trade-marks. The public and the trade must decide for themselves whether it is desirable to purchase goods from manufacturers who, under the findings of the Court, *began business with the deliberate intention of fraudulently palming off their goods as those of a reputable manufacturer.*

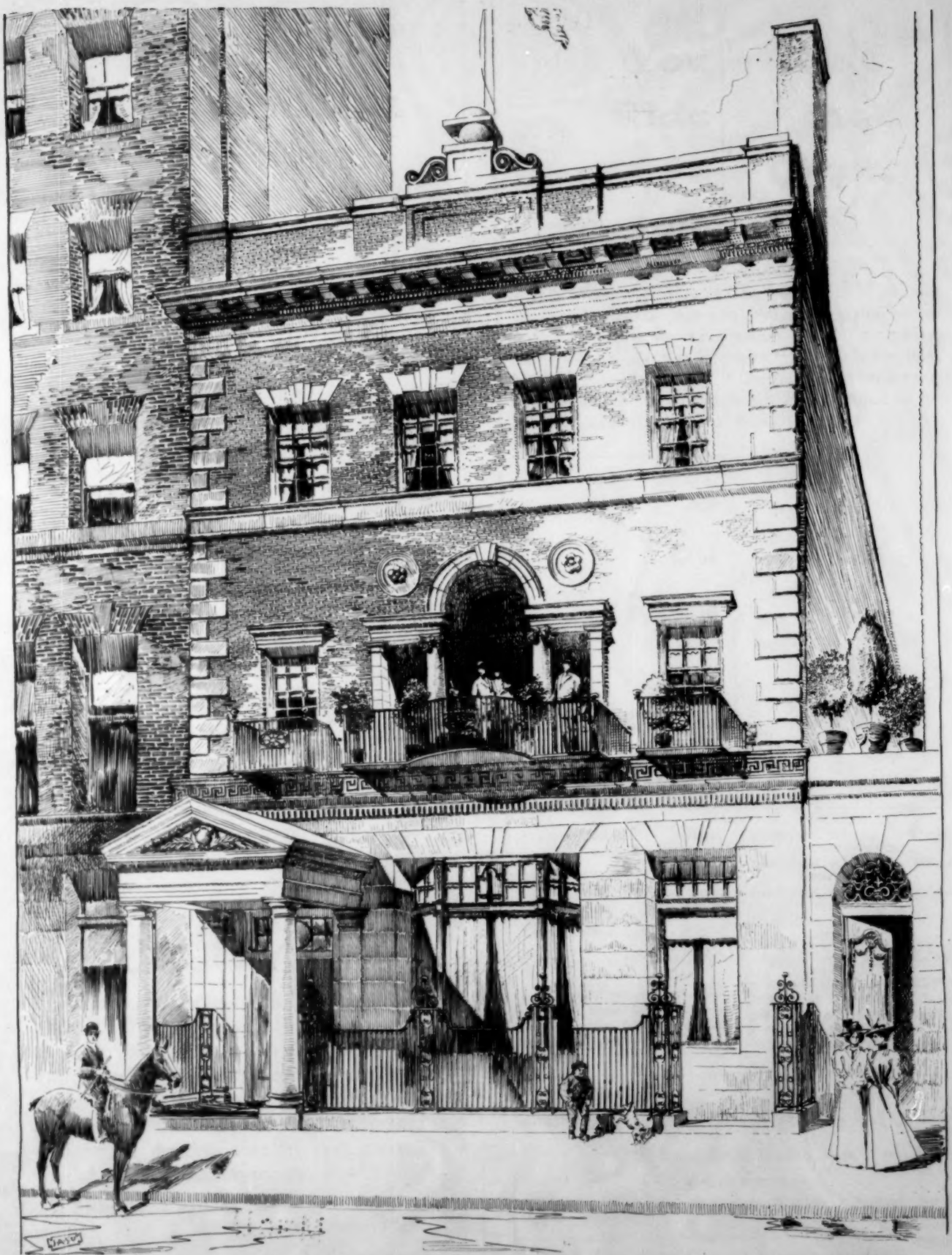
In purchasing our goods, kindly see to it that they bear the words "Metallic Clinton Paint" or "Clinton Hematite Red" printed upon the picture of a barrel.

We will consider it a favor if our friends will notify us if any infringements of our rights come to their knowledge.

CLINTON METALLIC PAINT CO.,

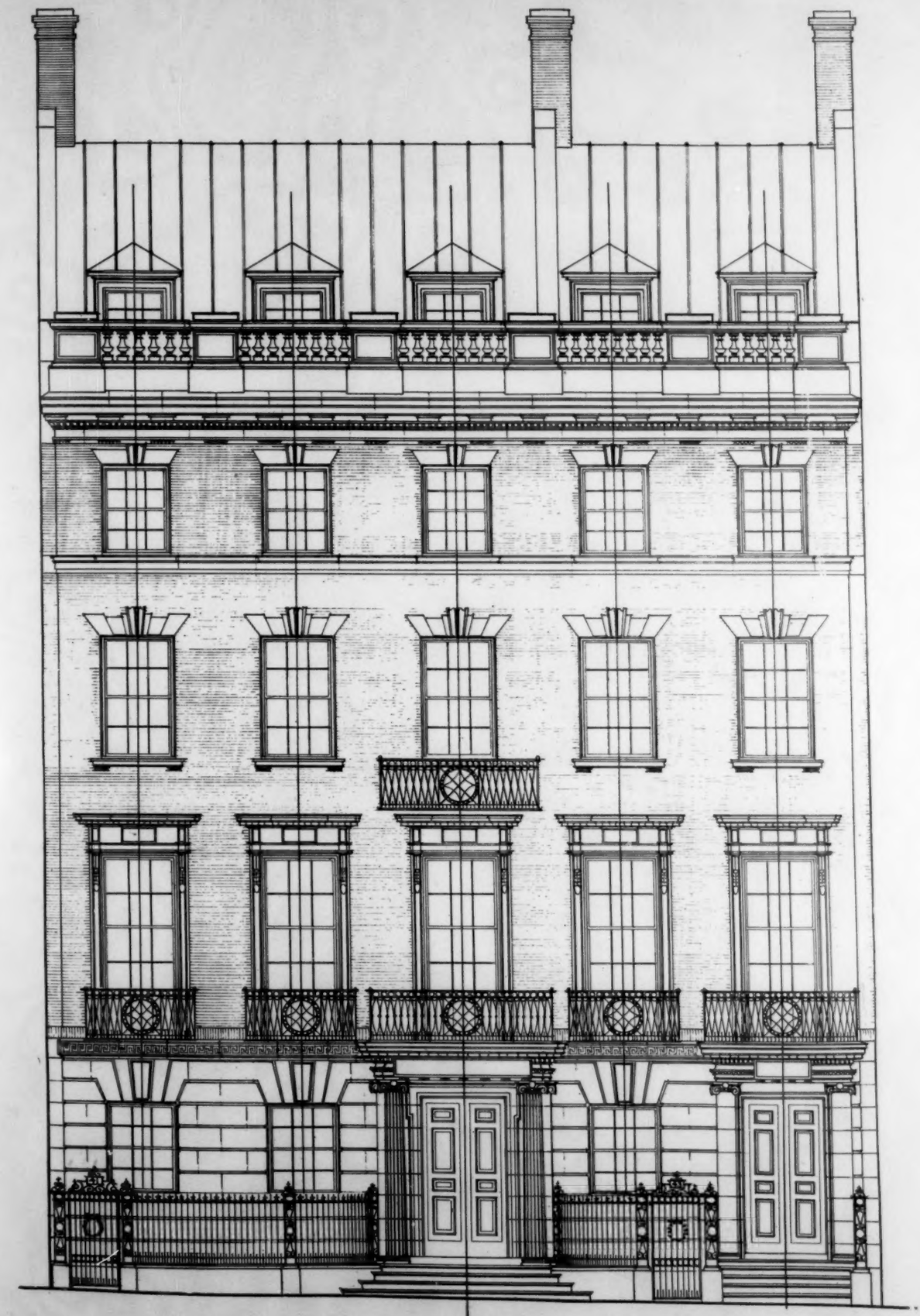
Clinton, N. Y.

May 16, 1898.

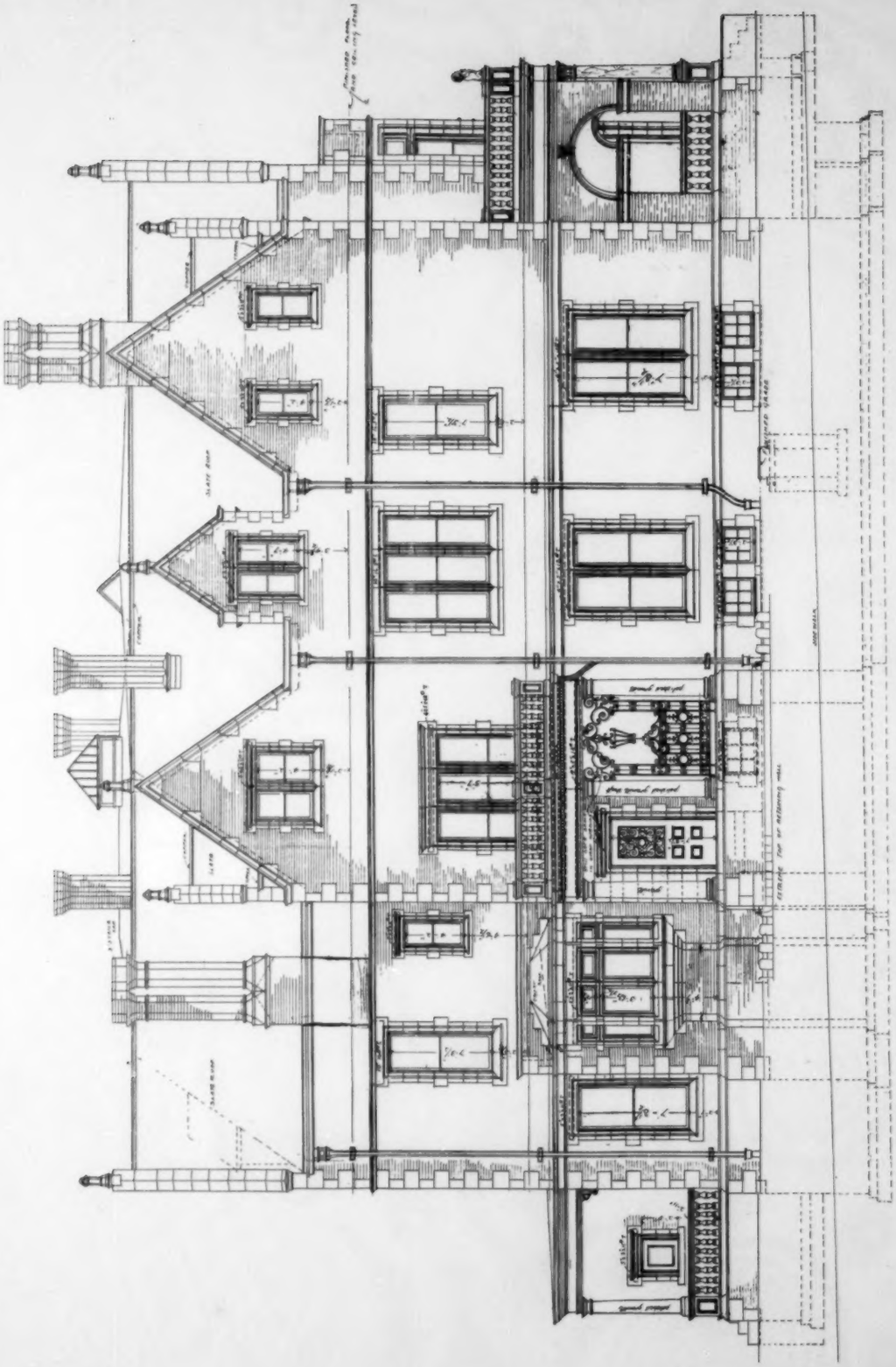


WEST SIDE REPUBLICAN CLUB HOUSE, BOULEVARD, BETWEEN 83D AND 84TH STS., NEW YORK CITY.

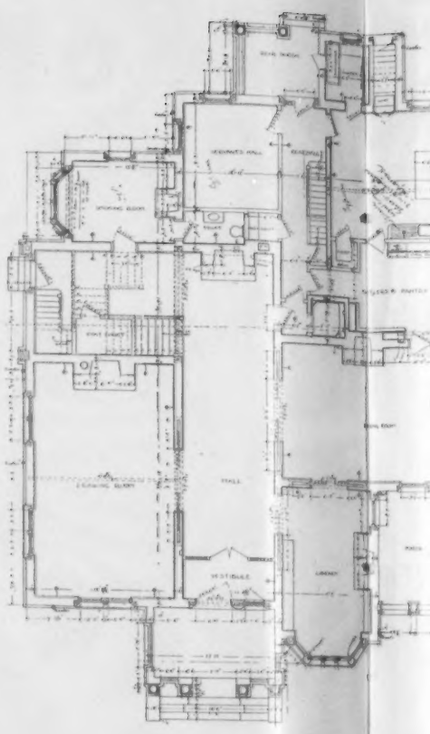
J. A. SCHWEINFURTH, ARCHITECT, BOSTON.

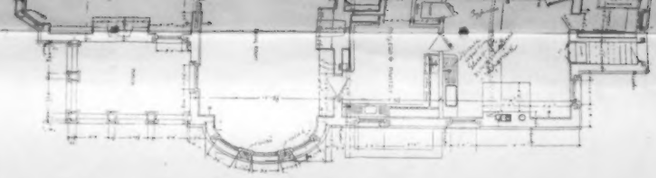


HOUSE FOR JAMES J. GOODWIN, ESQ., 54TH STREET, NEW YORK CITY.
McKIM, MEAD & WHITE, ARCHITECTS.



WEST ELEVATION.



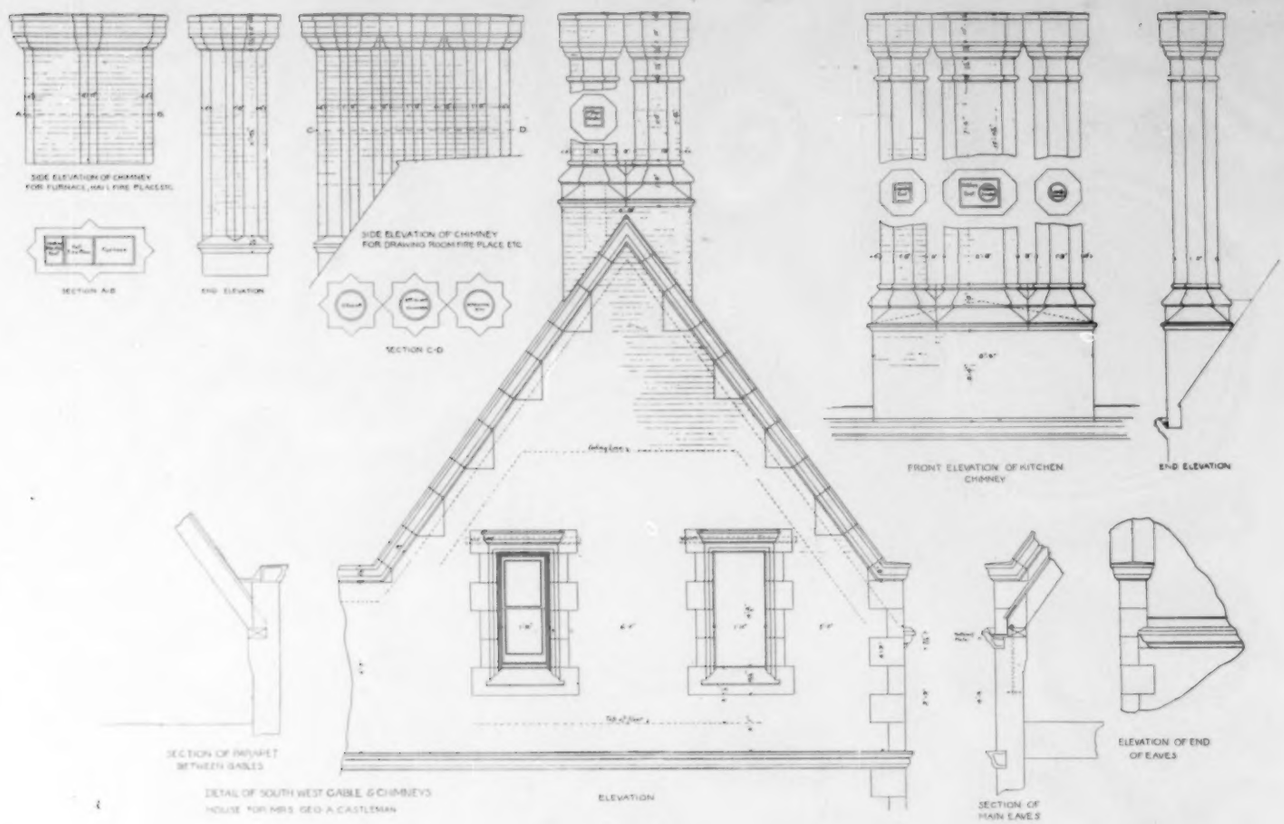


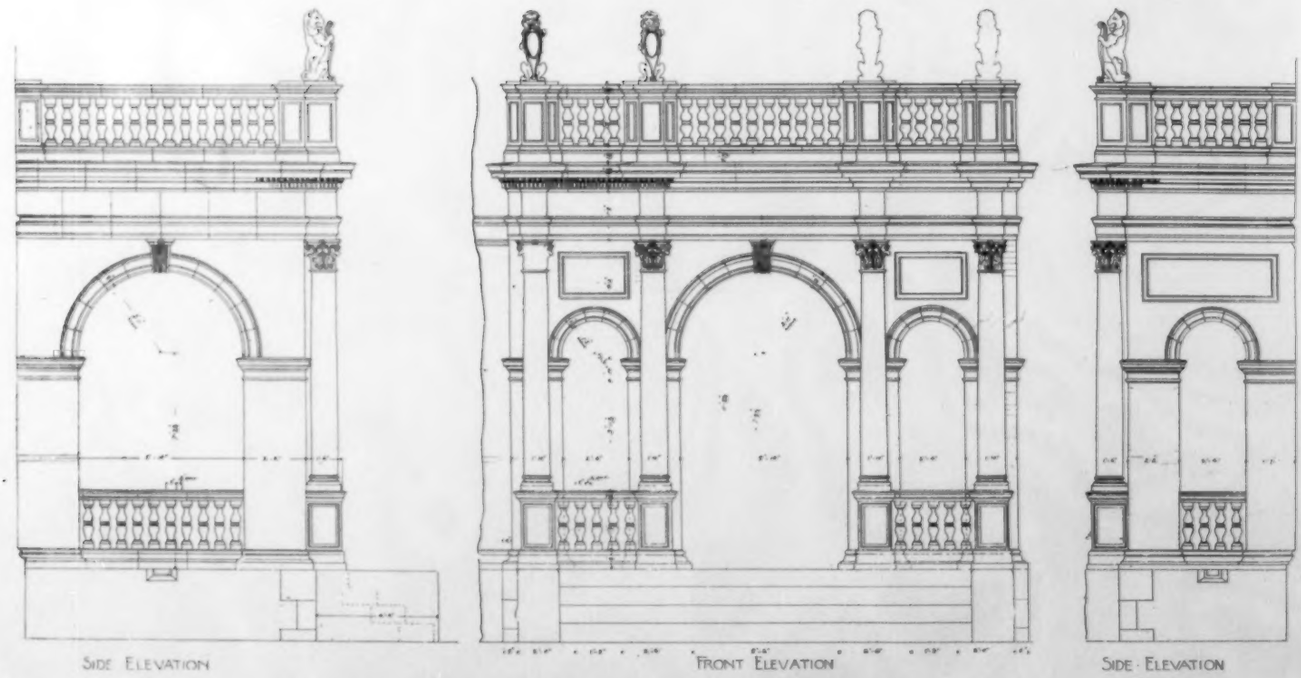
First Floor Plan

Front Elevation.

HOUSE FOR MRS. GEORGE A. CASTLEMAN, ST. LOUIS, MO.

RENWICK, ASPINWALL & OWEN, Architects.

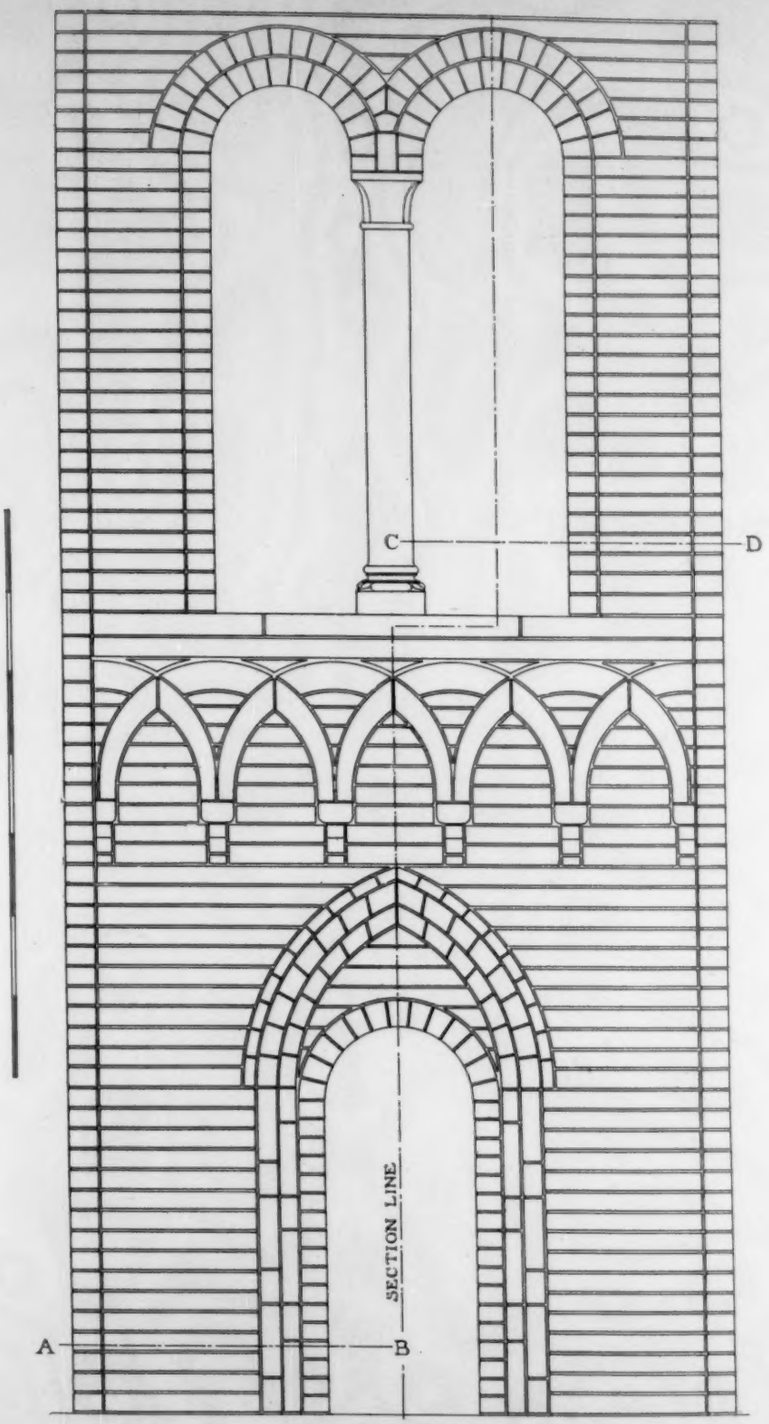




SIDE ELEVATION — FRONT ELEVATION — SIDE ELEVATION

DETAILS, HOUSE FOR MRS. GEORGE A. CASTLEMAN, ST. LOUIS, MO.

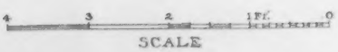
RENWICK, ASPINWALL & OWEN, ARCHITECTS.



ELEVATION

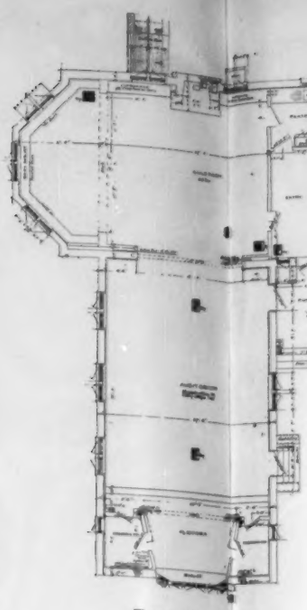
SECTION

PLAN A-B PLAN C-D

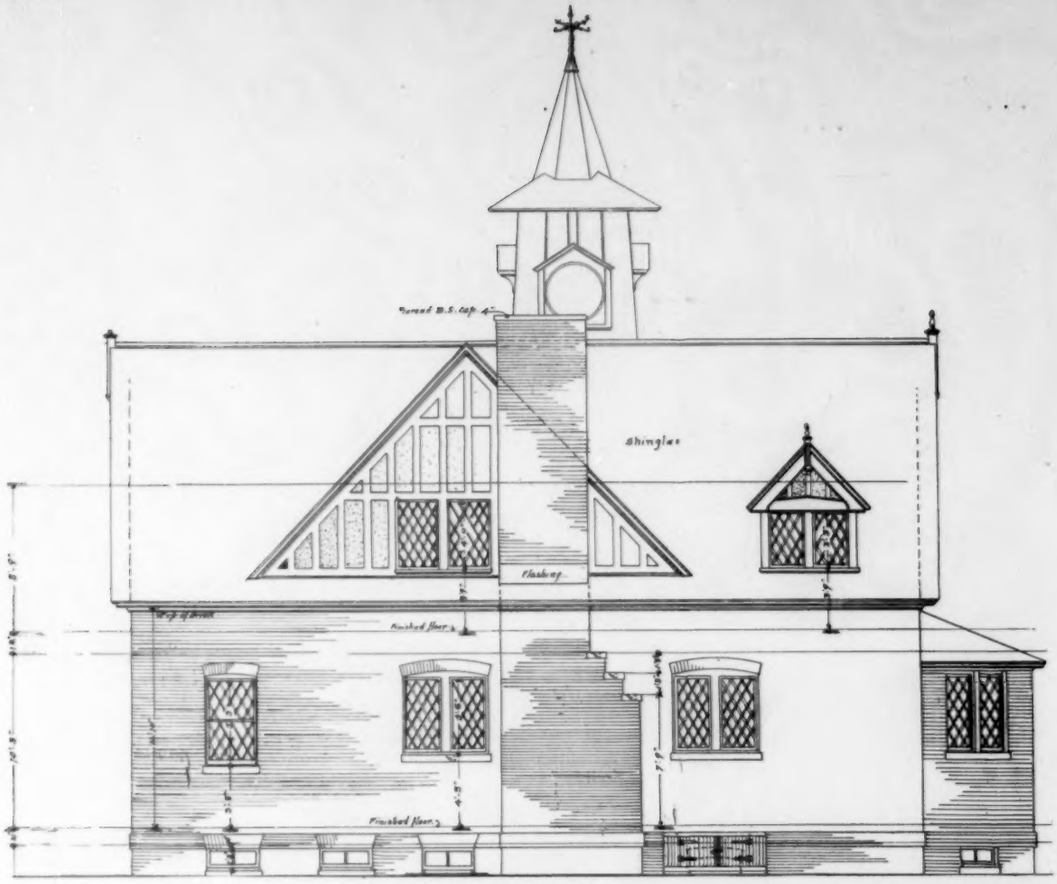


MEASURED DRAWING OF UPPER PORTION OF TOWER OF MONASTERY CHURCH AT CHIARAVALLE.

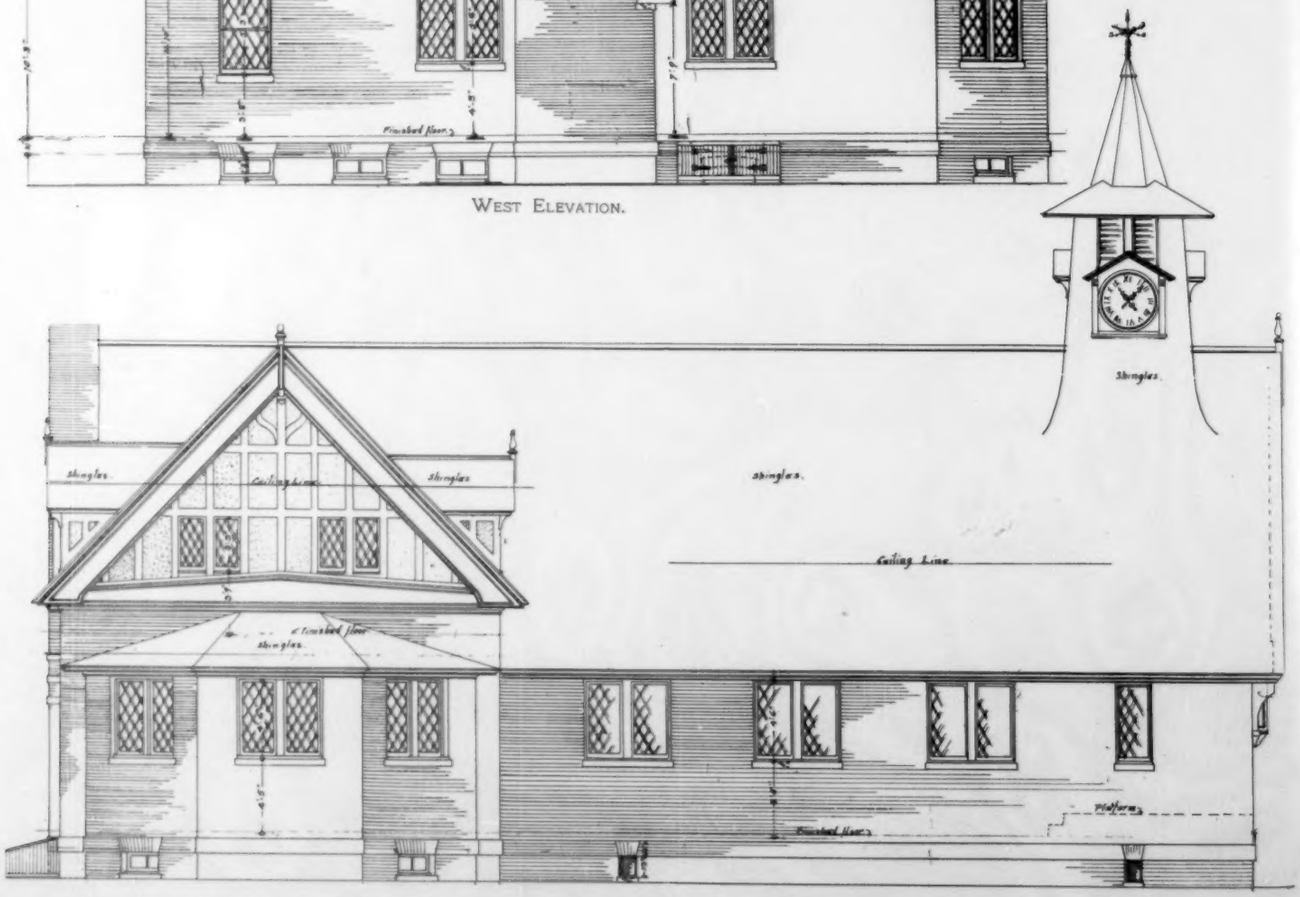
C. H. ALDEN, Del.



FIRST FLOOR PLAN.

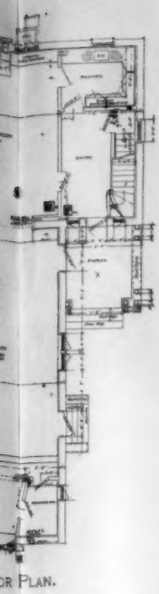


WEST ELEVATION.

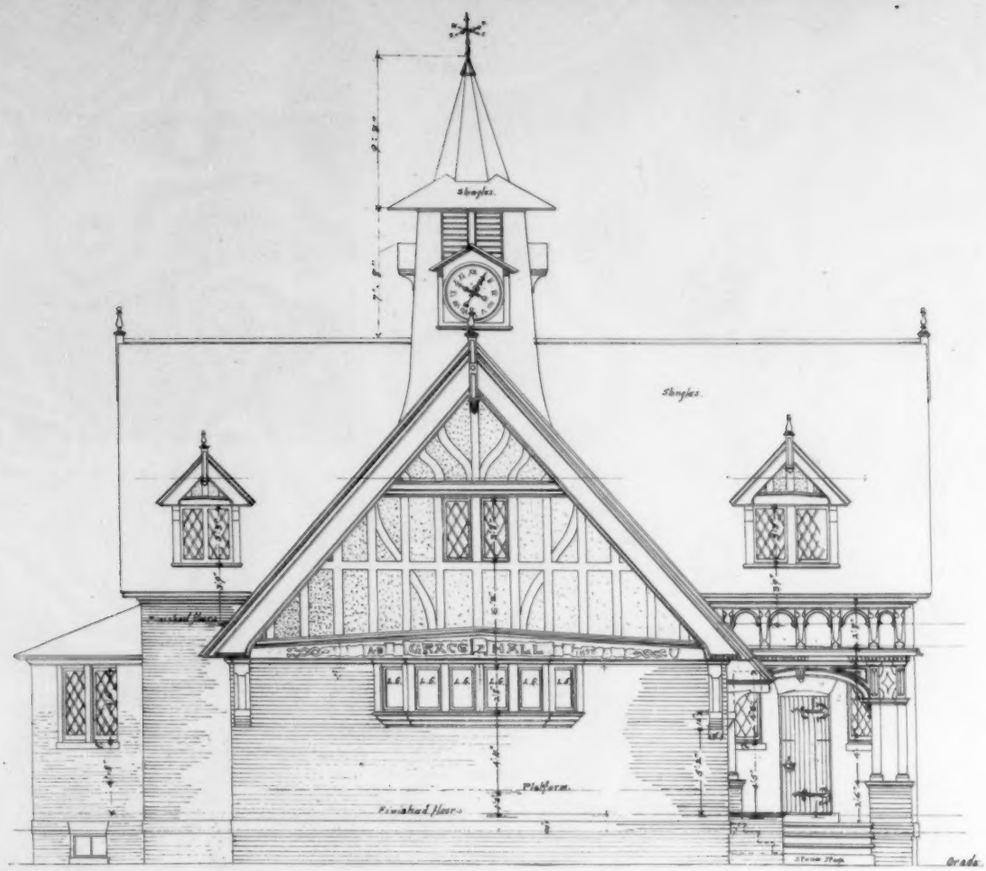


SOUTH ELEVATION.

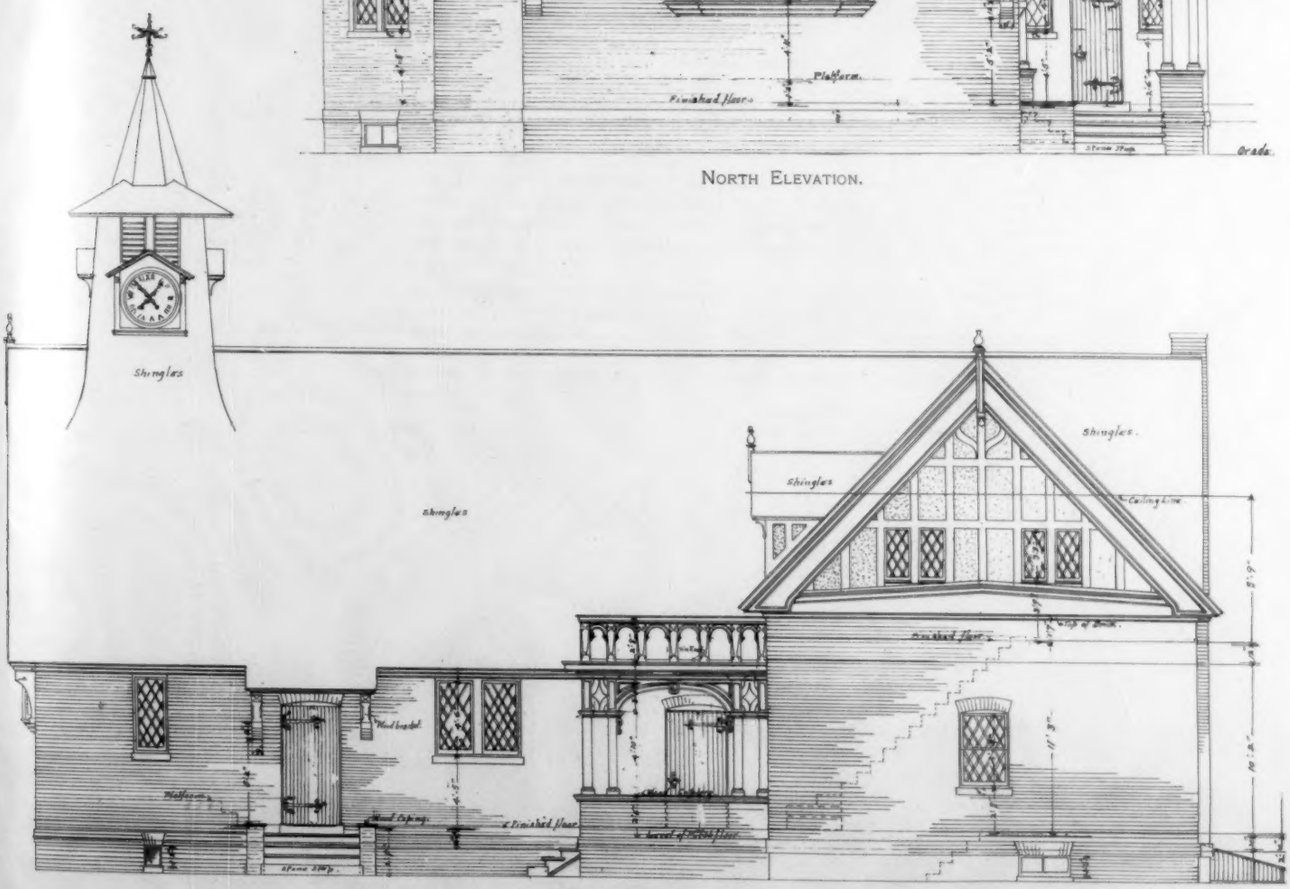
GRACE HALL, SING SING.
RENWICK, ASPINWALL & OWEN, A



OR PLAN.



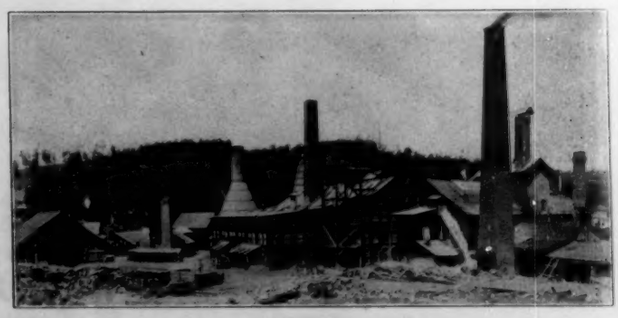
NORTH ELEVATION.



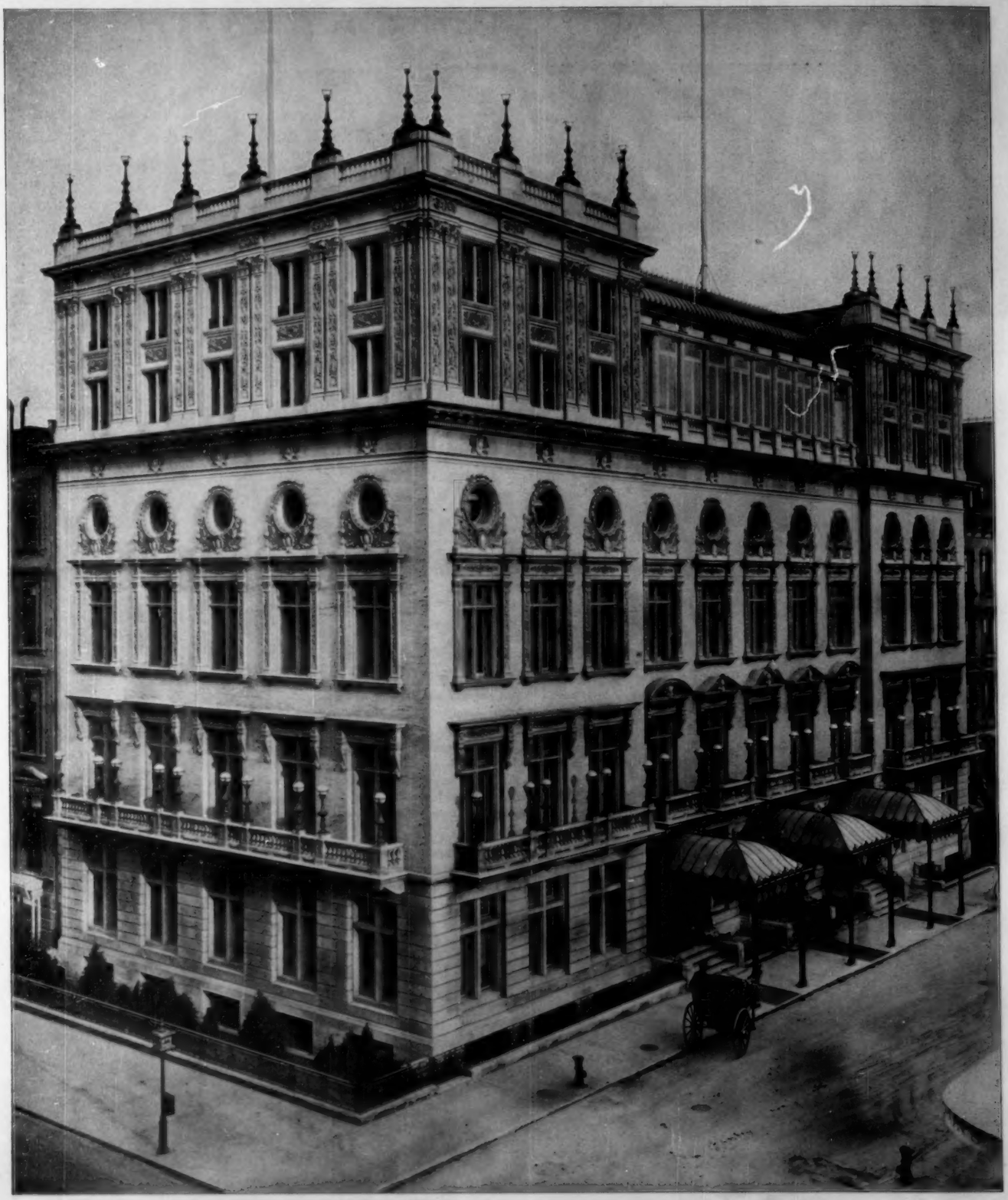
EAST ELEVATION.

SING SING, N. Y.
L & OWEN, ARCHITECTS.

WORKS OF THE CELADON TERRA-COTTA CO., LTD., AT ALFRED, N. Y., IN 1888.



THE CELADON TERRA-COTTA COMPANY'S WORKS IN 1898.



THE DELMONICO BUILDING, 44TH STREET AND FIFTH AVE., NEW YORK CITY.
JAMES BROWN LORD, ARCHITECT.